

The Commercial Car Journal

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Are You Getting Ready for Fall and Winter Business?

Now is the Time to Prepare a Definite Sales Campaign

Get Your Sales Force and Map Out a Plan of Action
Get Your Prospect List and Sales Literature Under Way

GET BUSY NOW!

THE month of August is usually considered one of the slowest from the sales point. Vacation periods and the tendency to slow down will have to be replaced by intensive sales activity, otherwise a great many dealers will find next winter a very trying one. In two weeks a new month will appear on the calendar pad—September.

Every dealer should start the month right by laying plans for a fall and winter sales campaign.

No one can offer any panacea for the truck industry, but if a few fundamental basic principles are followed out by the truck dealer and adhered to conscientiously, he cannot help but achieve success. The degree of success will be proportionate to the **energy and hard work** which he injects into his business.

First of all the dealer must fully realize that the time has arrived when merchandise is no longer bought. **It has to be sold.** This applies to the motor truck industry the same as any other industry. From observation, however, one is convinced that many dealers have not realized this to the fullest extent. We continuously run across dealers who feel that the business will come to them. The excuse is—that it isn't there, or that such and such concerns are laying up part of their equipment. But why let that interfere with going out after brand new customers. There are hundreds of business houses in every fair sized city that haven't any trucks. Why not solicit this trade instead of worrying about the large concerns that have enough truck equipment for the present and perhaps for some months to come.

This is about the biggest joker in the average dealer establishment. No, we do

not infer that the prospect list is to be considered an unnecessary adjunct to the dealers' business, but we do mean that the average prospect list is about 75 per cent dead wood. Why? Simply because the list is not kept up to date, or because it contains the names of lots of concerns that are absolutely out of the market.

Recently we made inquiries regarding the number of concerns certain prominent dealers in one city had on their prospect list. Invariably the answer was 6000, or thereabouts. Further investigation revealed the fact that these dealers subscribed to the same listings which were furnished by a company making a business of furnishing lists of all kinds. These names were compiled from registration figures and other sources. This is proper enough—but how many dealers take these lists and weed out the undesirables.

Revamp the Prospect List Continuously

The point we wish to bring out is simply this. A prospect list must be gone over continuously. A lot of names on cards are worthless unless the companies or individuals represented show some indication that they are in the market for a truck immediately or in the very near future.

Too much valuable sales and follow-up literature, plus postage, is wasted by many dealers simply because the dealer does not check up his prospect list carefully. Better results will be obtained by following up 50 real honest-to-goodness prospects with well-thought-out sales literature, personal calls and personal letters from the dealer or sales manager than wasting time on 1000 questionable prospects in an indiscriminate fashion.

The prospect list should also be segregated according to trades and a special drive made on those industries which offer the potential market for a certain period of time. For instance, with the approach of the fall and winter months the coal dealers and department stores in the cities offer a better market than the soft drink and ice cream trade. In other words, the dealer must analyze and study his markets just the same as every other trade has to study its markets.

The dealer must know his product from A to Z. Too many salesmen are still trying to get by with a smattering of knowledge regarding the product they sell or policies of their organization. The buyer is asking more questions than ever. He expects to be sold, and high-class, intensive, thorough salesmanship is necessary to convince him. But the best salesmanship in the world will amount to nothing if the dealer does not stick to a definite policy relative to his trade-in allowances.

What Can the Dealer Do?

Unfortunately the trade-in evil is one of the curses of the industry. Some day it will be eradicated—but that day seems to be a long way off.

One of the troubles today seems the desire on the part of the dealer to make sales regardless of the profit derived. He is so anxious to make the sale that very little consideration is given to the resale or market value of the truck trade in. We admit, of course, that competition is keen and that orders are not found in the morning's mail as used to be, but does that call for a continuation of a practice that cannot do otherwise than force the dealer against the wall? Why have so many dealers failed in the motor truck fields? Simply

because they have failed to realize that they cannot give their profits back to the customer and at the same time stay in business.

The other day the sales manager of a prominent truck company called at this office. This company builds an excellent

There is only one answer to this question, and that is co-operation among the dealers. As long as dealers and branch houses persist in bidding against each other just so long will the truck-buying public keep on shopping amongst the trade. In fact it is not news to the trade

get together and organize an appraisal bureau will this practice be curbed, and a sensible price be placed on the trade-in. And every dealer who joins in this movement must live up to his obligations. Simply joining in such a movement and then doing as he darn pleases will not get



It Requires Hard Work and Determination!

product and the company itself is in first-class shape. One of the first questions Mr. Salesmanager asked was this: "What in the world can we do to curb some of this wild trade-in business? The condition as present is simply deplorable."

that some prospective customers purchase an old truck from the junk man and then take it around from dealer to dealer and eventually trade it in for double or three times the amount paid for it.

Not until the dealers in every big center

the dealer anywhere. If the appraisal bureau plan is carried out carefully and honorably, every dealer will be amply repaid by obtaining the profits due him, and the gyp and curbstone pirate will be eliminated.

Maybe Some of Our Readers Can Answer This

July 21, 1921.

To the Editor:

Can you solve this conundrum? My husband is a clean cut man, honest, efficient, and so on, and can sell trucks, clean sales—no trades, and they stay sold, too. But as soon as he gets the sales started, why they do not want him. He never

goes on a drawing account—always carries himself; whereas they give would-be salesmen a drawing account week in and week out. They are always going to make sales, but nine times out of ten they do not, and the firm is out what they paid them.

Now, can you give me the answer? We read the CCJ and will look for the answer.

H. E. D.

(We sincerely regret that we cannot offer any solution to your problem. Perhaps the companies your husband has been associated with were perfectly willing to be shown how to sell trucks, and as soon as they possessed that knowledge they saw fit to discharge the tutor. We feel sure that your husband should experience no difficulty connecting with a concern that will appreciate his services these days, as selling trucks is no easy matter.)

Are You

Showing the Sales Department

The Way to Get Business?

Have You Planned Any New Sales Activities?

Are Your Salesmen Selling Specifications

or

Are They Selling Truck Transportation and Service?

By A. R. KROH, Manager Farm Development Bureau Goodyear Tire & Rubber Company

"**B**EAT a retreat," said Napoleon to the Drummer Boy, in one of his battles, when he thought he was losing, and his army must retreat in order to be saved.

"Sire," said the Drummer Boy, "I have never learned to beat a retreat, but I can beat a march that will make the dead rise and fight."

He received instructions from the General to beat a march, into which he threw his very soul. The tired, weary, almost defeated soldiers caught the inspiration of the charge, and with a new energy and quick fire of body and spirit rushed once more into the battle and won a great victory.

Many men in the Truck Industry, manufacturers as well as dealers, displayed the white flag when the nation's business slowed up in 1920 and started to beat a retreat.

In this retreat, some took the trail of suicidal price cutting, others took down retrenchment avenue, so fast in their endeavor to run to cover that they have utterly ignored the question of servicing trucks which were already in the hands of users, and there is such a stench of dissatisfaction that they will never be able to stage a comeback.

Others were so completely overcome with fear and discouragement that they have sat themselves down in the high-ways of the nation's activities in despair, and permitted the retreating force to run them down and tramp the very life blood out of their factory organization, their reputation and dealer's organization.

Courage and Stamina Needed

What a pitiful thing it is that an industry blessed with such marvelous potential possibilities and of such vital importance in the nation's great transportation problems should have permitted fear and cowardice to thwart its progress.

Fortunately there were those in the industry whose business policy as to quality in product and practice of merchandising was of such a character that when the

fear devil crept into the minds of the masses these refused to beat a retreat but responded to the call of the march of victory.

Good Feature of the Depression

What has happened to the Truck Industry in the last twelve months would ultimately have come upon it. The gratifying thing about it all is, that the deaths that have come upon the industry have been sudden and the businesses remaining alive with the correct foundation of principle, squared away in their March to Victory unencumbered by a lot of weaklings that would ultimately have died a lingering death, because of their lack of business judgment as to product, policy and service.

Beneath the wrecks in the truck industry today you will find a total lack of a desire to serve, mixed with greed for unfair profit in efficiency and laziness.

In the past some manufacturers have had but one idea in mind and that was to get theirs and after that let the dealer and consumer buyer fight it out. In most instances the dealer, upon entering into a contract arrangement with the factory, was totally ignorant of the problems that would ultimately confront him and when he was brought face to face with these problems he found to his great discouragement that the manufacturer had neither the intelligence nor desire to help him.

When the manufacturer and dealer base their whole activity on the rotary slogan, "He profits most who serves best," and their whole activity is based upon the principle of giving the consumer buyer full value for his dollar invested, both as to product and service, we will be able to eliminate a lot of the small type paragraphs, from the present-day contracts.

I know men who are hanging onto the truck business by the skin of their teeth and are so thoroughly whipped by their own fears and by listening to pessimism of others that they are continually pouring money into the hands of so-called salesmen who are still going around talk-

ing bore and stroke, mid-ship transmission, or unit power plant, worm gear against internal and have absolutely not one redeeming characteristic or interesting sales argument.

Across the street from this kind of an organization we find a man who sees failure written on all his competitors' faces. He glories in a battle, and when the fight is hard he calls his organization together frequently and keeps them thoroughly imbued with optimism and fighting ability.

They do not talk mechanical construction. Before this man ever signed his contract with a manufacturer he knew that the commodity was right. He has brains enough to know that the buying public are not interested in a tiresome tirade against competitors' commodities, and intelligent enough to know that the buying public have already accepted his commodity as a satisfactory unit of transportation. This man's salesmen are talking interestingly and constructively early and late—they check into the place of business early in the morning and they are up and doing every hour of the day, and they are backed by the correct principles of the organization. They are not cutting prices,—they are not losing trade—they are bringing in legitimate dollars for the legitimate piece of merchandise. They are glorying in their success and superiority over pessimism and indolence. They are fighting every step of the way, never beating a retreat,—never losing a battle.

Survival of the Fittest

The man who does not admit that the Truck Industry is undergoing a healthy readjustment is foolish. It will take months yet to bury the dead institutions and eliminate dishonest practice, but to those who survive will come the glory, honor and profit that always comes to a hard worker and clean fighter.

A banker in the Northwest a year ago loaned 17 farmers money for a period of one year. When he asked for liquidation the farmers said they could not pay. When

litigation was threatened 14 out of the 17 farmers dug up the money out of tin cans under the wood pile to pay the notes. There is money where we least expect it.

I was in a hustling city in the Southwest the early part of June and things had been at stagnation point in this city for weeks. Ten inches of rain fell in the farming community around this city in the first seven days of the month. This rain guaranteed the success of 1921 crops and the Saturday I spent in this town the farmers were in by the hundreds and they

were spending money so fast that the merchants were absolutely astounded.

The present seeming business depression is a condition of mentality—Mr. Business Man, "What are you doing to correct that sick mentality."

"Mr. Dealer, if your salesmen are not at your place of business to greet you upon your arrival in the morning, it's your fault."

"Mr. Dealer, if your salesmen are not turning in new prospects and following them up intelligently, it's your own fault."

"Mr. Dealer, if your salesmen are wast-

ing time, condemning the competitor's commodity instead of selling transportation and service intelligently, you have no one to blame but yourself."

"Mr. Dealer, if your salesmen are not giving you 100 per cent day of honest effort for the dollar you are paying them, fire them. There are two million men in the United States out of employment, and surely out of that number we can find salesmen of ability, integrity and ambition."

1921 is rewarding fighters. Order takers must be replaced by salesmen.

What Can I Do? Others Have Asked the Same Question. It is Evidence of Thought. Think, Study, Analyze, and You'll Know What to Do

Make Your Prospect File an Intelligence Bureau

Psychology Teaches That the Most Effective Approach is When the User is Not Actually Ready to Purchase. Try "Pre-Selling." It is an Antidote for the So-Called Depression Period. More Vocational Training Needed

By H. T. BOULDEN

FOR nearly a year motor truck sales have been almost at a standstill. The result of this condition can only be one—and that is, sooner or later motor truck users will be forced to replace the equipment they have been using and wearing out.

At certain seasons of the year some businesses appear to be more likely truck users than others. In the fall, naturally the coal trade, and as at present with the large road building appropriations being made, the road contractors. But transportation is an essential part of all business generally, and as business conditions continue to improve so will the motor truck dealers' business get better.

A Good Point to Keep in Mind

The best time to sell anybody is when they are not ready to actually make the purchase. At such a time they will give more careful attention to the features brought out and their consideration will be more serious and from the viewpoint of application rather than from the angle of making a purchase and getting the best price possible. In selling a user at the time when he is going to buy he will be found to be on the defensive. He naturally realizes that he is forced to spend the money for a truck and every one who talks truck to him is therefore—in his mind—doing everything they can to get his order and money. At any other time this feeling does not exist with him and it is possible for the conscientious truck salesman to get across his points as a specialist in motor truck use.

Heretofore a great many motor truck

agencies have done business simply because there was a great amount of motor truck business to be done. Since business conditions have changed these same dealers are the ones who have suffered from loss of business the most. But the dealers who have always kept in touch with the motor truck users in their city or town, have gone on selling trucks right through the so-called depression. Of course, they haven't sold near as many as they did when business conditions were better, but they have been supplying the needs for motor trucks right along.

Making a Thorough Canvass

The dealer who hasn't a list of every truck user in his city, showing how many trucks, what size and make, age and use, is overlooking the first necessity of successful dealership.

To secure such a list requires a seemingly great amount of effort, but it can be secured best by making a systematic "door-to-door" canvass of every business place. This information should be tabulated on cards or in a record as a nucleus of activities of the dealership.

If I were a dealer in these days of slow sales I would daily lay out routes to be covered and canvass each and every business place in my city until I had a complete list of every motor truck user, the name of the man who looks after the motor truck part of the business, the number of trucks they own, the size of each and the age of each. When this information had been secured I would immediately commence "pre-selling" these users by correspondence and literature on the prod-

uct which I was selling. In addition to this, the most likely buyers would be called upon as frequently as possible—not less than once a month. My list would be duplicated as many times as was necessary to list the users into different manners, such as vocation, type of body, and approximate date of next purchase. Whenever I had special literature or information that would appeal to any one set of users I would make it a special point to see that this was sent to each of them.

The majority of manufacturers are today operating efficient pre-selling campaigns which can be utilized by the dealer at very much less cost than the same results can possibly be obtained by salesmen. This pre-selling by correspondence serves to put the dealer's trucks before the motor truck users constantly and in the best manner to interest the user in the features he finds from experience are most essential to his successful operation of motor truck equipment. Besides, this pre-selling by correspondence keeps before the motor truck users the dealer's name and the fact that his is the place the user should look to, whenever the user is in need of anything in the motor truck line,—just the same as the housewife goes to the grocery store when she is in need of groceries.

A dealer who will first secure the information regarding the motor truck users in his city or town, keeping himself before these motor truck users, will find that as all the different lines of business improve, he will be in touch with them and have the opportunity of selling them their motor truck requirements.

Here's a Good Example of

TRADE ORGANIZATION ACTIVITY

Read How Pennsylvania Dealers Have Instituted a State-Wide Campaign Among Truck Owners for Their Protection Against Drastic Legislation, Better Roads and General Improvement in Public Transportation Facilities

MANY of our readers will perhaps recall the article which appeared in the May issue of the Commercial Car Journal, entitled "What Happened in Pennsylvania," relative to the attempt of State legislators trying to pass a bill which had for its object additional registration fees on motor trucks. This bill was caught barely in time to prevent its passing without a compromise.

The actual crisis which then faced the motor truck owners and which would have imposed burdens on the owners, making it impossible to operate their trucks, was only averted by combined energetic action.

But it emphasized the necessity of a united State-wide organization on the alert to protect the interests of motor truck owners and ready to bring pressure to bear with a solid front upon those responsible for originating and passing laws. The organization has no desire or intent to thwart beneficial and essential legislation, but merely desires to be in a position to present to the Legislature correct data as to all matters pertaining to the motor truck and its allied interests as affecting the general public.

Organize for Strength

Therefore, in the interest of the owners of 60,000 motor trucks throughout Pennsylvania, the Motor Truck Association, of Philadelphia, has launched a campaign among all these owners to secure their membership in the Association, so as to form a formidable State-wide organization for their own protection and advancement in matters of legislation, good roads and improving general transportation facilities for the public.

The membership campaign is being operated from Philadelphia, for that portion of the State east of Altoona, embracing 16,500 truck owners, and from Pittsburgh, by the local truck association of that portion of the State west of Altoona, including nearly 10,000 truck owners.

These 26,500 truck owners operate the 60,000 trucks in the State, hauling millions of dollars' worth of merchandise over many thousands of miles of road through the State yearly. Of the total, 9,000 owners are located in the Philadelphia metropolitan district.

The Motor Truck Association, of Pittsburgh, is affiliated with the Philadelphia Association, which is the largest truck

Motor Truck Association of Philadelphia

OFFICERS:
W. Y. ANTHONY
President
CHAS. J. SWAIN
Vice President
W. H. METCALF
Secretary
328 N. Broad St.
W. R. WALTON
Treasurer



BOARD OF GOVERNORS:
T. K. QUIRK
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W. H. MANWARING
D. H. ZIMMERMAN

association in the State, and includes practically every truck dealer in Philadelphia, and many of the leading owners. It was the Philadelphia Association which, through a vigorous last-minute advertising and publicity campaign during the last session of the State Legislature, costing thousands of dollars, made such a vigorous protest to the members of the Legislature that it reduced the proposed new license fees from prohibitive figures, ranging from 80 to 210 per cent increases to an average increase of about 100 per cent, thus saving to the motor truck owners of the State approximately \$750,000 for two years, yet netting the State Treasury additional funds of \$1,000,000 for the State Highway Department for maintenance of roads. In addition to accomplishing this saving to the truck owners, the Association's representatives at that time also secured an amendment to the gasoline tax bill of 1 cent a gallon on gasoline sold within the State, providing that one-half of the tax should revert to the county in which it originated.

Immediate Enrollment Urged

The present membership drive is to lay before every truck owner the advantages of belonging to one or the other of the two leading truck associations of the State. To this end they are sending out letters, membership blanks, return envelopes and printed matter, setting forth the objects of the united organizations, to each of the 26,500 truck owners. The Philadelphia Association, to encourage the movement, has waived the regular initiation fee of \$5 and is only asking a \$5-a-

year membership fee. This nominal fee entitles the member to a membership card, to mailed copies of State and National Highway Bulletins, and to a copy each month of the Commercial Car Journal, the Philadelphia Association's official organ. This literature will keep the truck owners in touch with all highway conditions throughout the State, in addition to other vital matters regarding the operation and use of motor trucks all over the country.

Furthermore, the Philadelphia Association holds monthly meetings, throughout nine months of the year in Philadelphia, and periodically in every important center throughout the State, with discussions of every phase of motor truck operation by leading authorities, including transportation experts, manufacturers and public men.

Past Activities Commendable

The Philadelphia Association, the pioneer motor truck association of the State, is nine years old and in that time has accomplished big things for its ownership members. In 1915 and 1917 through its Legislative Committee it prevented any change in the automobile laws, which were being considered and which were demonstrated to be unjust to the industry and to the owners. In 1919, the Association was successful in reducing the exorbitant motor truck license fees as proposed by the Buckman Bill. The 1921 successful campaign against similar license fee increase and other achievements of the Association are cited above.

Walter Y. Anthony, president of the Motor Truck Association, of Philadelphia, in speaking of the owner membership drive, says: "Our Association suddenly realized last spring that there was something vitally weak in our activities. We had failed to appreciate that in organization there is strength. We were unexpectedly confronted with proposed bills in the Legislature that would have been ruinous to thousands of motor truck owners. Consequently, every truck owner in the State was sent a postal card urging him to see or wire his representative, laying the facts strongly before him. Telegrams began to pile up on the legislators' desks. They were personally importuned. They began to feel the weight of united action. They admitted they didn't know how unfair the bill was. They were glad to learn. We carried the day."

"Other equally important matters are likely to come up at any time. Speed regulations, relations with sister States, etc., are all matters affecting every truck owner. We are as anxious as the public to protect the safety of lives of persons on the highway. We don't want trucks to be regarded as a menace. Our activities are directed toward securing only careful

and competent drivers and to eliminating the reckless, irresponsible driver. Our Association, in which we hope to include every truck owner, gives its members a source of information as to the reputation of drivers that they could enjoy in no other way. We feel, therefore, that we are rendering the truck owner and the public, an invaluable service by getting

the owner into our Association, so he can enjoy the mutual benefits of our activities and of the information we provide. We trust the truck owners will wake up to this opportunity and take advantage of our exceptional membership offer."

Dealers of Pennsylvania! Do your part in encouraging your owners to join in this movement.

Adapting the Tractor-Trailer to the Express Business

A Significant Experiment Being Conducted in Three Cities by American Railway Express Company to Facilitate Movement and Transfer of Freight Between Railroad Terminals

ONE of the long-standing problems in the operating end of the express business has been to speed up and to conduct more economically the transfer of express matter between railroad terminals. Under the present system with one carrier handling this traffic on practically all of the railroads in the United States, the transfer problem has been greatly simplified and placed on a more scientific basis.

The consolidation of the express companies three years ago resulted in the express traffic being handled by one centralized organization and the inauguration of a vast national scheme of through-car routes. In the cases of some cities, however, the necessity of transferring express matter between the incoming railroad and the outgoing connection, by motor truck, could not be avoided.

Taking Chicago as an example, there are some 29 railroads with 19 railroad terminals and about 500 trains, incoming and outgoing, on which express matter is handled. Yet there are no trans-continental railroads, and even the traveler has to transfer at Chicago to another road. The monthly express business at Chicago, delivery and pick-up, averages about 1,600,000 shipments, of which 60 per cent is transfer.

Trucks for Transfer Indispensable

Each day between 45 and 50 railroad cars, solid with express matter, pass through the city and are switched to other railroads, bound east or west and requiring no inter-city transfer. But the express company still has a big problem in the movement of the remaining transfer matter and employs about 300 power vehicles, with the same number of chauffeurs, for handling the vehicle deliveries and transfer. During a period of twenty-four hours, 1625 loads of transfer freight, averaging 55 pieces to the load, are hauled by the motor trucks—mostly gas cars of the larger capacities—assigned to this work.

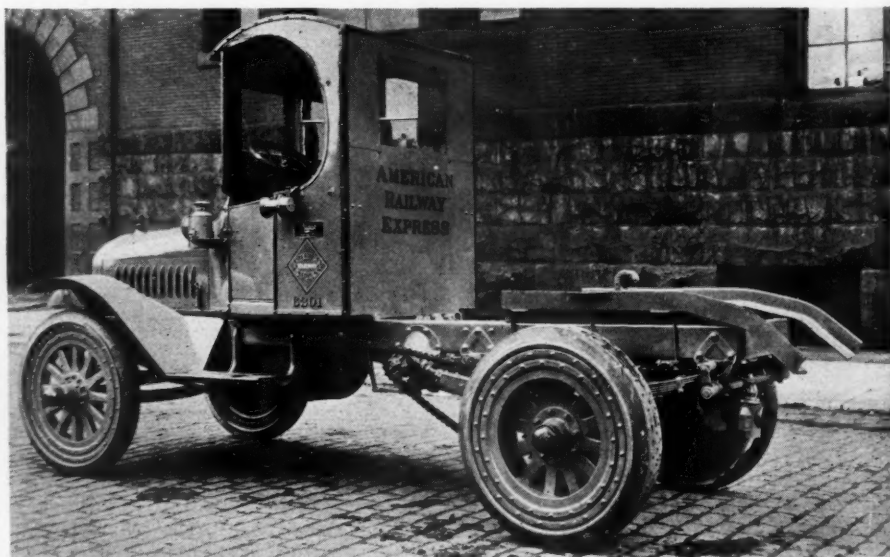
The express operating officials had been studying the tractor and trailer system, which is used by the Post Office and a number of the mail order houses at Chicago. They finally decided to try the experiment themselves, selecting Chicago as the logical point for the trials. Mack tractors and Lapeer trailers were added to the city express motor vehicle equipment and used in combination, with very satisfactory results. One of the benefits has been to cut down the expense to the express carrier of handling the transfer and making the express matter transported less susceptible to losses by theft.

New System Logical Medium

Another distinct advantage has been that the tractors and trailers have been assigned to and used in this service exclusively. Heretofore a very large volume

of express traffic has necessarily been handled on auto trucks and horse-drawn vehicles of outside teaming concerns, because of the fluctuations in the amount of the traffic, and the express company's equipment being not sufficient to handle anything in excess of the normal traffic. The trailers are of the closed-body type, which travel under lock while in transit across the city, preventing the traffic from falling off of vehicle on cobble-stone streets, protecting it against bad weather conditions and making it impervious to the attacks of thieves.

At the present time, the express company has in Chicago four tractors of five-ton capacity and fourteen semi-trailers of three and one-half ton capacity in use. Three of these tractors and twelve of the trailers are in daily service, the remainder being held in reserve for relief work. The



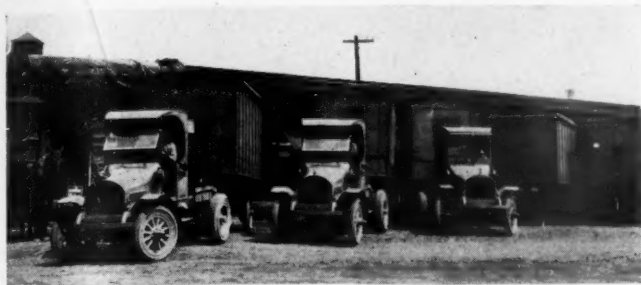
View of the Tractor Employed by the American Railway Express

success of the trailer system leads to the possibility that other units of this nature will be added to the express equipment in

According to figures furnished by A. W. Hayes, Bureau of Organization of the express company at Chicago, the volume

and safe movement of freight, the plan possesses other distinct advantages. It is possible, for instance, in many instances to load a trailer by trucking directly into it from express cars, thus conserving warehouse space and reducing the number of handlings. The trailers may also be placed at any convenient point for loading or unloading.

The principle of the tractor-trailer system of hauling is better adapted to the express business and much less costly to



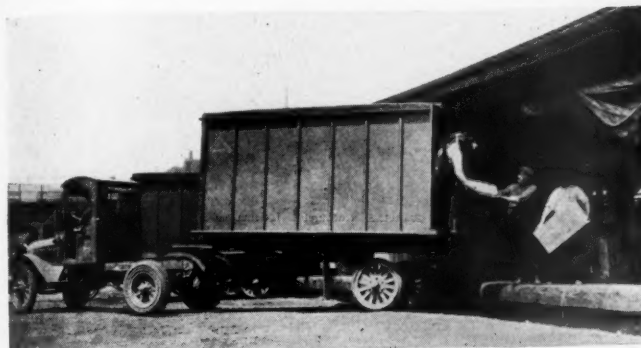
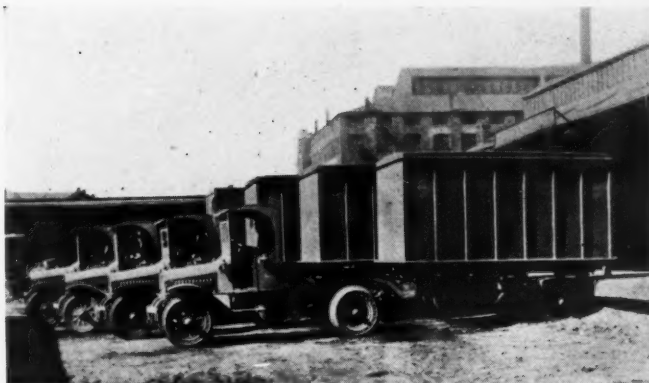
Tractor - Trailer System in Operation.

the future. The bodies are equipped with trap doors of special design.

Empty Movement Eliminated

The tractors are operated on a twenty-four hour basis and the work is so arranged as to reduce the empty movements to the lowest possible minimum. For example, trailers are distributed among

Chicago Express Tractor Fleet



The Trailer Body Opens Only at One End and is of Special Design

several express terminals and when a tractor arrives with a loaded trailer, it is backed into the warehouse for unloading. The same tractor then hooks on a loaded trailer containing traffic for some other terminal. In other words, a tractor conveying a loaded trailer from the Central Terminal to the Clinton Street Terminal is scheduled to "pick up" a loaded trailer at the latter terminal, for movement to still another terminal.

The trailers are equipped with van bodies, opening only from the rear, the doors being locked while in transit between terminals. The keys to the locks are held only by designated employees at each terminal. The loading and unloading is performed by terminal employees and under this arrangement, the chauffeur is the only man necessary for the mechanical operation of the service.

Each tractor hauls an average of one and one-half loads per hour, the average distance per load being about two miles. The number of loads hauled by each tractor in twenty-four hours is more than double the number hauled by regular three and one-half ton gas cars, and more than three times the number hauled by horse-drawn vehicles.

Reduction in Cost

In addition to the very favorable showing in number of loads hauled by the tractors compared with the gas cars, it has been demonstrated that the cost of operation of a tractor and its family of four trailers is not materially greater than for one five-ton truck.

of transfer traffic at Chicago at this time is averaging 2800 double wagon loads per day of twenty-four hours. This, however, does not include about 1000 loads of local out-bound business necessarily hauled daily from the billing stations to the various terminals and team tracks for loading into cars.

In addition to insuring the economical

install and operate, in the opinion of the express people, than the plan used by some of the railroads for transferring less-than-carload traffic interchanged with other lines. The latter uses expensive hoists, pits, special driveways, requiring that all such handling be done at a fixed point.

The Chicago railway express people hope to add to the tractor and trailer equipment, until the service has been extended to some of the large mercantile establishments, where the volume and character of traffic warrant. The success of the Chicago experiment has led the express company to install a similar equipment at Philadelphia, where three tractors and nine trailers are soon to be put into operation. It is also contemplated to use tractor and trailers in Boston.



Service Truck Employed by the Philadelphia Distributor of Day-Elder Trucks

Before this particular truck, which was one of the first sold in the Philadelphia territory, was finally added to the service department of Manwaring & Goodman it had passed into three different ownerships. Before it was placed into service it was completely overhauled. That the job was handled thoroughly is indicated by the fact that it hasn't been off the road since.

Do You Own a Commercial Garage?

Strict Rules on Entering and Leaving, as Regards Time and Method, and Adherence Thereto, Have Spelled Success for This Philadelphia Concern

By K. H. LANSING

CONDUCTING a commercial garage presents problems that do not arise in the operation of a garage harboring only passenger cars. There must be certain strict rules governing the entrance and exit of the vehicles, both as regards method and time. And charges should be computed, not upon wheelbase, as in the case of passenger cars, but upon size of body.

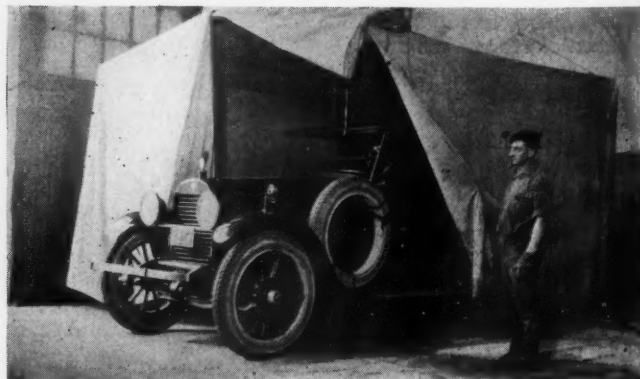
Unless there are exceedingly rigid regulations in force, the garage concern which has the bulk of its business in the storage of trucks, although housing a certain number of touring cars, runabouts, limousines and other automobiles, is almost sure to gravitate toward trouble in the shape of mix-ups on the floor, angry disputes, and damage to vehicles, which inevitably will be followed by loss of custom or lawsuits.

One commercial truck storage house which fully appreciates the value of inflexible rules, and which successfully accepts for storage both commercial and passenger cars on the same floor, is the B. & O. Garage, conducted at 344 N. Third St., Phila., Pa., by Maxwell G. Bloch and Lewis J. Ostroff. Both partners are thoroughly experienced in the care and operation of trucks and automobiles and have sur-

rounded themselves with men equipped with similar knowledge.

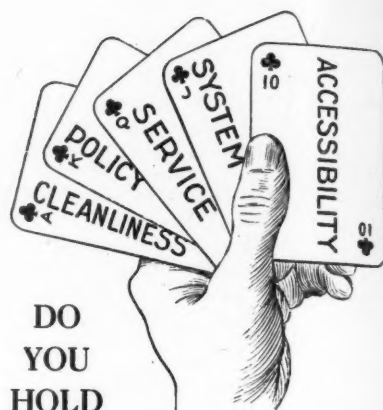
They have so arranged their business to accommodate on an average of 150 trucks for night storage, and from twenty-five to thirty passenger cars for day storage. There is a hard-and-fast agreement signed in advance by each owner to the effect that he will vacate the garage no later than 6 o'clock every evening. The car owner goes into this arrangement with his eyes wide open.

It is necessary to take this step, because the trucks, ranging all the way from half a ton to seven tons capacity, begin to arrive about 4.30 to 5 P. M. and as this is primarily a commercial garage, it is imperative that the trucks have the space.



General Views of the B. & O. Garage, Philadelphia, Pennsylvania

Above: Front view. Four large entrances and two sets of gasoline tanks minimize damage and obviate delays. Left: View of garage interior. Trucks are stored here so that those sure to leave first in the morning can make their exit in the easiest and quickest manner. Right: The customer who cares to pay \$2 a month extra may have his car protected by a stout canvas cover like the one illustrated, enveloping the vehicle like a tent.



DO
YOU
HOLD

A ROYAL FLUSH?

The business balances nicely, most of the passenger cars leave the garage before any appreciable number of commercial cars come in. The majority of the passenger cars arrive about 9 A. M. and are allotted to their respective places long after the trucks have left for the day. In summer, the bulk of the trucks is in the garage by 4.45 P. M. and out by 5 A. M. Some of the big meat and produce trucks, however, leave as early as 2 in the morning.

The floor space in the B. & O. Garage is 125 by 210 ft. and, with the exception of a small office, shop, and parts and accessory division upstairs, is used exclusively for the purpose of storage.

A big feature in the successful operation of this garage lies in the fact that the building has four entrances—two large ones on N. Third St. and the same number on Orianna St., which parallels Third.

This arrangement eliminates awkward turns and leaves clear aisles, permitting entrance and exit, no matter if the garage is full to capacity, without danger of collision, with normal exercise of care. This, too, despite the fact that there are stored here many cumbersome trucks, of the type used by riggers.

It is a rule of the garage that

the wide left-hand aisle, as one enters from Third St., shall remain clear in any event. Trucks are filled with gasoline, oil, water and air in the morning and the can must always be carried to the vehicle, which is not allowed to stop in an aisle for any purpose. Air must be obtained at the Orianna St. right hand door, never at the left hand side. There are two gasoline tanks at the entrances on both streets. There are two air compressors, which greatly tend to reduce delays by permitting simultaneous filling.

To further minimize delays and accidents in the garage, service accorded to customers includes having one of the garage employees guide by signals the owner, or driver, of every stored truck in entering, backing up to position for the night and leaving in the morning. If, for any purpose, a truck should enter and leave the garage more than once during the day, the same guidance will be rendered. In the case of a new driver, or an "extra" man on a customer's truck, the management sees to it that one of its own men does the actual driving in and out, while a second garage employee does the guiding by signal, giving any other reasonable aid required. This method minimizes accidents from carelessness and ignorance.

Where the truck owner has a competent driver, the latter backs the vehicle into position, which is either with the rear to the wall, or back-to-back with another truck in the center of the building, the vehicles forming a long double row, each facing an aisle; or in other manner whereby the truck may be taken out without disturbing any other vehicle. The largest trucks usually occupy the space in the center of the floor.

Straight Aisle Formation

While the building is not without interior supporting posts or columns, the actual number is small in consideration of the size and structure of the building, and as the parking of the vehicles is arranged with an eye to making the posts guides to aisle formation, they are converted into a help rather than be a hindrance.

While the same space usually is assigned to a particular truck night after night, this space cannot be assured to the owner. Trucks that are sure to leave earliest in the morning, for the common good are assigned to positions where they may be taken out easiest and quickest.

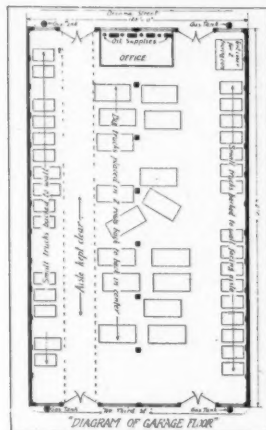
When the passenger cars are stored, during the day, they are ranged along the walls, facing the center.

Those who have especially valuable cars, by paying two dollars a month extra, obtain the protection of a strong canvas cover suspended on ropes and pulleys and dropped completely around the car in tent form. Each of these tents will accommodate two automobiles, the covering being twelve by fifteen feet. Such a light colored tent not only has the physiological effect of warning against the slightest contact from any other machine, but keeps the car dustproof and free from dampness.

The floor is well illuminated and ventilated by large skylights, not mentioning

the windows and doors; and the artificial lighting system is satisfactory.

Everything is laid out with a view of affording strict efficiency and economy in all operations. To obviate wasted time and labor in replenishing the oil supply of the vehicles, a battery of oil tanks, supplied with pumps, is placed on the same floor with the trucks, in the small downstairs, partitioned off section sufficing as the first floor office, which is situated be-



Layout of the B. & O. Commercial Car Garage

tween the Orianna St. doors. A stout-mesh wire barrier, provided with locking gates keeps out intruders. A portable wheel tank delivers the oil direct to the stored vehicles, or a small can may be carried, if preferred.

In the small space upstairs—not truly a second floor, as it extends over only a very circumscribed portion of the first floor—is a stock of greases, cleaning compounds, spark plugs and a few accessories mainly for accommodation of regular customers.

The concern makes minor repairs and adjustments on the vehicles stored in its care. Its equipment consists of the small-

er devices, such as vises, bench tools, portable drills and apparatus for removing and putting on pneumatic tires. Should a customer desire it, the management will take care of shoe vulcanizing and heavy repairs, by having it done outside. The concern, too, gives its customers the benefit of a reduction when they order parts and accessories, as, of course, the house can obtain them at a lower rate than the patrons themselves could make the purchases.

There are usually four men on hand in the garage, at least one of this number being a member of the firm. Constant supervision, day and night, plus expert workmen, equals satisfied customers.

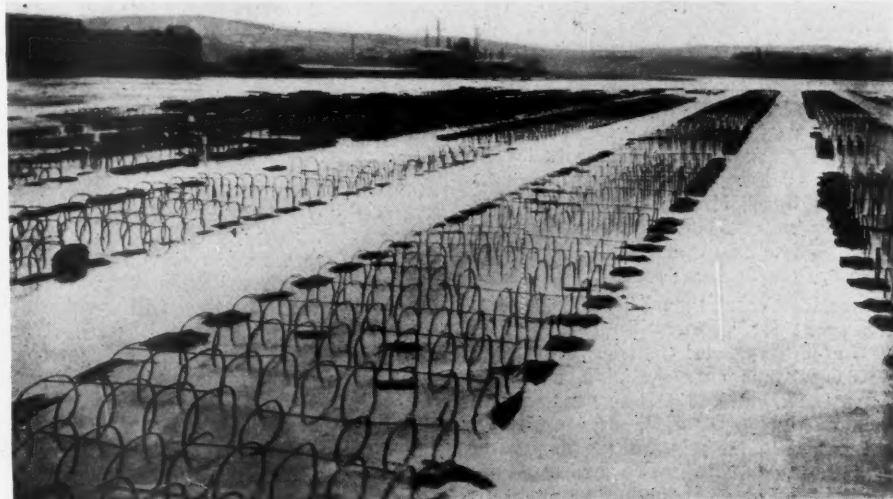
The plan of storage has been simplified as much as possible. It has here but two classifications—"live" and "dead." "Live" storage includes at least one washing a week and on the "dead" storage plan no vehicle is washed unless it is especially requested, in which event the proper extra charge is made.

Charges for truck storage range from \$15 to \$35 a month and for passenger cars from \$10 to \$12 a month.

Personal Tinkering Not Permitted

A strict rule is in force that no owner may wash his own car in the garage, or work upon it with either his own or the garage's tools. Everyone, on becoming a customer, signs in advance the agreement to pay by the month. Any unusual stipulations agreed upon are recorded in the signed paper.

As should be the case in all garages, but especially in commercial garages where the danger is greater for obvious reasons, every precaution against fire is taken. Not only are the usual signs posted forbidding smoking in the building, but gasoline, oil, waste and greasy paper are kept off the floor and out of corners; all litter of any kind whatsoever is quickly cleaned up and the matter destroyed, which makes the garage tidy as well as a safe place in which to store.



Why Some of the Returned Army Trucks Are Not Worth Buying at Any Price

No these are not scrapped submarines or prairie schooners, but some 2000 motor trucks, the property of the armies of occupation, submerged by the flooding of the German River Rhine. Only the tops of the cabs and the tarpaulin bows are visible. Some of these trucks, it is said, are now being sold for commercial use in the United States.

Do You Know What Relationship the AUTOMOBILE INDUSTRY Bears to GOOD ROADS?

THE growth of "The Good Roads Movement" in the United States and Canada since its organized inception in 1880, and with the great stimulus it received in the periods immediately following the advent of the automobile and the appearance of the motor truck has been so rapid, so extensive and so effective that highways construction today constitutes one of the greatest, if not the greatest, problems in American economic life.

There are now 1702 organized agencies actively and directly pleading the cause of good roads. The agitation, to date, has brought about the construction of 310,000 miles of surfaced highways—raising the highway mileage of the United States to 2,478,552 and that of Canada to 255,000.

What Good Roads Mean to the Automotive Industry

The automotive industry, fourth largest in the country, with 368 manufacturing plants capitalized at \$1,204,378,642 and employing 325,000 workmen; having an annual output of 2,205,197 passenger cars and trucks valued at \$3,594,814,620, and supplemented, as it is, by 1,900 firms producing auto parts valued at \$300,000,000 a year, together with 1000 firms manufacturing annually 35,000,000 tires valued at \$1,000,000,000, is absolutely dependent upon highway improvement for its stability and upon increased road mileage for greater expansion. In addition, 33,000 distributors of automobiles are involved as well as 45,800 dealers in automobile accessories and 35,000 dealers in tires. So great, too, has the road-building industry become, in consequence of the demand for improved roads, that there are now 7500 contracting firms engaged in actual construction work. The roads are now traversed by 9,211,295 licensed cars and trucks, of which 3,000,000 are used on the farms. These cars consumed 3,200,000,000 gallons of gasoline last year.

Since 1880 more than \$3,000,000,000 has been spent for highway improvement in the United States and Canada. More than \$1,300,000,000 is now available, and, \$1,500,000,000 additional will be necessary to carry out projects under contemplation. And yet, with all this, only a beginning has been made. Billions more must be expended before the country has anything like an adequate highway system.

The great demand for good roads and the progress made in road building has evolved many types of hard surfaced roadway. The most recent available figures

**Are You Sufficiently Informed to Discuss the Subject?
Do You Know That \$1,500,000,000 Are Needed? Are
You Getting Your Share of Contracts for Contractor
Trucks to be Used in the Big Road-Building Program?**

By C. S. LEE, Director Highways Information Service, New York

disclose the following percentage of types surface roads in existence today:

Road	Per Cent
Gravel	42.11
Macadam	25.22
Sand-clay	17.16
Asphalt and other bituminous materials..	10.98
Concrete	3.91
Brick .....	.62

The figures for the asphaltic and brick types, a total of 15.53 per cent show the extent to which the city types of pavement have been adopted in the rural districts. The wood block and the granite block types do not appear to have progressed as yet beyond the city boundaries.

Recent testimonies show that 107 Federal aid projects completed and paid for to May 25, this year, were roads built of bituminous materials. These highways were constructed in the following states:

Alabama	Louisiana	Ohio
Arizona	Maine	Oklahoma
Arkansas	Massachusetts	Oregon
California	Michigan	Pennsylvania
Georgia	Minnesota	Rhode Island
Idaho	Missouri	South Carolina
Indiana	New Hampshire	Texas
Kentucky	New York	Vermont
	North Carolina	West Virginia

Additional Federal aid highways of the same types have been approved and are under construction in:

Connecticut	Maryland	Tennessee
Florida	Montana	Utah
Illinois	New Jersey	Virginia
Kansas	New Mexico	Wisconsin
	Nevada	Wyoming

States Active Participants

According to other figures compiled by the Federal Bureau there are now 22,030 miles of Federal Aid roads in the United States. These have cost \$361,946,868. Latest figures compiled by The Asphalt Association, New York, show that \$343,678,712.36 were made available in 569 new highway bond issues by states, counties, townships, road districts and municipalities in May and June, this year. This makes \$1,343,678.36 now available for road work in the United States during the next two years.

It has been only by the most persistent efforts on the part of the advocates and the formation of militant organizations everywhere that "The Good Roads Movement" has been carried to its present high estate. The automobile and the motor truck have done more to form a favorable sentiment than any other agency. As a result of association activity today forty-

eight states have highway departments.

Of the agencies that are now fighting for highway improvement, 50 are organized movements for the construction of certain national or interstate highways, 15 are national or interstate good roads associations, 34 are state organizations, 304 are automobile associations and motor clubs, 260 are road contractors, material or machinery trade associations and engineering societies, 32 are motor truck and automobile trade organizations and 131 agencies are publications devoted to the movement in one form or another. In addition, there are 735 chambers of commerce, merchants' associations and boards of trade having good roads committees and 135 national trade or industrial associations having standing committees which frame the policies of those organizations in matters pertaining to highway improvement.

Many national organizations sprang up, chief among which were:

American Highway Association
American Road Builders' Association
Automobile Chamber of Commerce
American Association of State Highway Officials
Associated Highways of America
Federal Highways Council
National Highway Traffic Association
National Highways Association
National Park Touring Association
Public Land States Highways Association
Tri-State Good Roads Association
The Canadian Good Roads Association
United States Good Roads Association
And others

Interest on the part of nearly 10,000,000 automobile and truck owners as well as the owners of 6,000,000 teams of horses and mules regularly using or working on the highways, not to mention the smaller numbers of Federal, state, county, district and municipal highway officials, engineers, contractors, manufacturers of machinery and materials, rural mail carriers, resort owners, farmers, merchants, real estate dealers, motorcyclists, bicyclists and others directly interested, has given to the movement strength so great that no politician, national, state or local, dare refuse to listen when there is an honest demand for road improvement. At least 30,000,000 Americans are now advocates of good roads.

Highway Bond Issues Show Big Increase

According to figures from reports to the Asphalt Association, New York City, for the month of June, 1921, compared to figures for May, provision for future highway work in the United States and Canada, took a big spurt during the month just closed. During June a total of \$179,307,359.36 in new bond issues for roads

and streets were reported from 310 states, counties, townships, road districts and municipalities, compared to \$164,371,353 from 259 similar divisions of government having charge of highway work. This is an increase of \$14,936,006.36 for June over May and makes a total of \$343,678,712.36 in new bond issues over and above the \$1,000,000,000 previously available, or a grand total of \$1,343,678,712.36 now available for highway work in the United States and Canada.

The reports show that greatest interest in highway improvement exists in:

Alabama	Michigan	Pennsylvania
California	Minnesota	South Carolina
Connecticut	Mississippi	Tennessee
Florida	Missouri	Texas
Idaho	New Jersey	Virginia
Illinois	New York	Wisconsin
Kentucky	North Carolina	Wyoming
Massachusetts	Ohio	

The southern states, especially, have been coming to the front. Pennsylvania, however, now leads the country in funds provided. Alaska, Arkansas, the District of Columbia, Maine, Nevada, New Hampshire, North Dakota, Rhode Island and Vermont, the figures show, are providing on the other hand, very little in new bond issues and apparently are taking little interest in highway construction. Ohio leads the states in the number of new bond issues, having reported 63 in June and 49 in May, a total of 112. New York follows with a total of 52 and Pennsylvania was third with 44. North Carolina reported 36 and Texas 35. Virginia led in amount of bond issues for June, reporting a total of \$51,419,000 last month as against \$810,000 for May. Pennsylvania was second for June with a total of \$26,078,000 and New York was third with \$23,634,860. Texas reported June bond issues of \$13,286,000 as against \$3,681,000 in May.

The total amount of new highway bond issues made available in each state last June was as follows:

State	Bond Issue	State	Bond Issue	State	Bond Issue
Alabama	\$2,682,000	Maryland	201,000	Oklahoma	150,000
Arizona	75,000	Massachusetts	496,000	Oregon	7,483,240
California	4,878,000	Michigan	4,000,000	Pennsylvania	26,078,500
Canada	3,329,016	Minnesota	5,072,900	South Carolina	1,440,000
Connecticut	309,000	Mississippi	1,892,000	South Dakota	60,000
Delaware	15,000	Missouri	425,000	Tennessee	2,910,000
Florida	3,855,000	Montana	395,000	Texas	13,286,000
Georgia	835,000	Nebraska	181,300	Utah	225,000
Idaho	2,190,000	New Jersey	7,007,500	Virginia	51,419,000
Illinois	8,839,000	New Mexico	875,000	Washington	416,000
Indiana	300,596	New York	23,634,860	West Virginia	39,000
Kansas	134,000	North Carolina	1,966,000	Wisconsin	384,500
Kentucky	320,000	Ohio	7,907,947	Wyoming	2,425,000
Louisiana	202,000				

For May the reports of new bond issues were:

State	Bond Issue	State	Bond Issue	State	Bond Issue
Alabama	\$1,087,000	Massachusetts	74,000	Oklahoma	1,114,000
Arizona	735,000	Michigan	3,195	Oregon	1,006,000
Colorado	5,000,000	Minnesota	1,783,134	Pennsylvania	53,453,000
Connecticut	40,500,000	Mississippi	520,000	South Carolina	2,915,000
Delaware	410,000	Missouri	10,414,000	Tennessee	3,363,500
Florida	2,094,000	Montana	200,000	Texas	3,681,000
Georgia	1,045,000	Nebraska	510,000	Virginia	81,000
Indiana	795,640	New Jersey	5,187,000	Washington	129,000
Iowa	750,000	New Mexico	147,500	West Virginia	21,000
Kansas	261,000	New York	2,109,242	Wisconsin	1,231,000
Louisiana	150,000	North Carolina	5,765,000	Wyoming	300,000
Maryland	120,000	Ohio	14,596,139		

California, Canada, Idaho, Illinois, Kentucky, South Dakota and Utah reported no bond issues in May while Colorado and Iowa reported none in June.

For the two months combined the number of bond issues and their total value in each state were as follows:

13—Alabama	\$3,769,000	3—Kentucky	320,000	112—Ohio	22,504,086
3—Arizona	810,000	4—Louisiana	352,000	6—Oklahoma	1,264,000
1—California	4,878,000	6—Maryland	321,000	19—Oregon	8,489,240
4—Canada	3,329,016	8—Massachusetts	543,000	44—Pennsylvania	79,531,500
1—Colorado	5,000,000	10—Michigan	7,195,000	16—South Carolina	4,355,000
3—Connecticut	40,800,000	23—Minnesota	6,856,034	1—South Dakota	60,000
2—Delaware	425,000	12—Mississippi	2,412,000	22—Tennessee	6,172,500
18—Florida	5,949,000	5—Missouri	10,839,000	35—Texas	16,967,000
11—Georgia	1,880,000	5—Montana	595,000	1—Utah	225,000
3—Idaho	2,190,000	9—Nebraska	691,300	11—Virginia	53,229,000
2—Illinois	8,839,000	22—New Jersey	12,194,500	6—Washington	545,000
12—Indiana	1,096,236	3—New Mexico	1,022,500	3—West Virginia	60,000
1—Iowa	750,000	52—New York	25,744,102	13—Wisconsin	1,615,500
2—Kansas	395,000	36—North Carolina	7,731,000	6—Wyoming	2,725,000

It will be seen from these figures that, insofar as this season is concerned, Pennsylvania is showing greatest interest in highway improvement, and has made available for future use more money up to June 30, than any other state in the Union. Virginia, Connecticut, New York and Ohio follow in the order named.

Classifying the Highways

That a public road building policy requiring road classification according to function as well as responsibility for construction and maintenance is necessary in order to carry on successfully a good roads program in this country is the gist of a treatise issued recently by the Nebraska Department of Public Works, on "How to Get Good Roads." The classification policy, the Nebraska officials point out, has been found upon adoption abroad to be successful for highway improvements.

"That which has secured roads overseas," says the bulletin, "should secure them here. First: There is the country road. Its primary function is to serve county needs. While its function is vital—linking farm and market—its use is mainly local. The county, therefore, should assume responsibility for it. It should be built and cared for by county funds. Exception should be made of certain roads in the counties whose function places them in another class—that of state or Federal roads. Second: There is the

all these and the various sections of the state with the state capital. The state, therefore, should assume responsibility for these roads. They should be built and cared for through state taxation. Exception should be made of certain roads in the states whose function places them in a third class—that of national roads.

"Third: There is the national highway, the aggregate of which will constitute the system of national highways. These are the roads which, while serving county needs, state needs and interstate needs, have for their primary function highway service to the country as a whole."

Robinson-Townsend Bill

WASHINGTON, August 1.—The fate of the highway legislation pending in Congress is expected to be known within a few weeks, as the conflicting measures dealing with this subject are now before the Senate committee on post offices and post roads, of which Senator Townsend of Michigan, is chairman. The parliamentary situation is this:

The Townsend bill was passed by the Senate and sent to the House.

The House committee recommended the Dowell bill, the measure backed by the Association of State Highway Officials, and others, and later the House struck out all of the Townsend bill after the enacting clause and inserted in place of that stricken out the Phipps and Dowell bills, combined. This combined measure was sent to the Senate after it had passed the House by an overwhelming majority.

In the Senate, Mr. Townsend succeeded in having this measure referred to his committee, where it now is. Naturally, the Townsend measure will be substituted for this bill, or possibly concessions made to an extent and the revised Townsend measure reported out. Then will come the fight on the floor of the Senate. Friends of the Townsend measure say their bill will again pass the Senate. Should it do so, and go back to the House it will face a majority opposed to it.

Therefore, the person who can today say what will happen in the way of highway legislation this session, if there be any at all, is a forecaster of real ability. The Federal Aid idea, based upon guarantees of maintenance of roads in which Federal money is spent, would seem to be in the ascendancy so far as sentiment in Congress goes, at least in the House. The Senate favors Federal Aid, but administered along the lines of the Townsend measure. This being the situation, highway legislation would seem to be in real danger.

A candid forecast would seem to suggest that the House measure, with possibly some modification, would today have the best chance of passage.

state highway, the aggregate of which constitutes the state highway system. These are the roads which, while serving local needs in the counties, have for their primary function highway service to the state as a whole. The system is usually planned to connect the county seats and

This Dealer Didn't Quit When Sales Were Slow

HE STARTED A BUS LINE

Now He's Running Two Lines, With More to Come, and He's Getting Lots of Experience

JUST now, when sales of motor trucks are as scarce as the proverbial hen's teeth, it is refreshing to find a truck merchant who is not scrambling to "move" a job at almost any kind of terms, but who is sitting calmly and serenely awaiting the solid, substantial growth that is bound to come to him with the return of normal conditions.

Such a man is John H. McBee, president and manager of the McBee Engine & Implement Co., Memphis, Tenn., merchant of Mack trucks. McBee is an unusual truck dealer—unusually because he thoroughly analyzes the various factors entering into his business and its relationship to the territory in which he is operating. Then from such analysis he builds a plan and has the moral courage to stick to it until it proves out.

The territory about Memphis is largely a cotton-growing country. When cotton, it being the big crop, is high, the people are prosperous—when low, they are all broke. Right now they are broke and are not buying trucks. But the territory has not been developed and possibilities for the future are great.

In September, 1920, Mr. McBee realized that there would be but few trucks sold in the Memphis territory for a year and possibly two. But he knows these people

and has faith in their ability to "come back." He also has faith in his ability to look ahead.

Right in the tightest of the hard times McBee moved into larger and finer quarters and prepared to make larger invest-



John H. McBee

President and manager of the McBee Engine and Implement Co.

ments in publicity—the sort of publicity that would make the people naturally think "Mack" when the time did come for them to buy truck equipment.

Radiating out of Memphis, like spokes

of a wheel, are ten main highways; going north and east into Tennessee, south into Mississippi, and west into Arkansas. McBee's thought was to get as many persons as possible in this territory acquainted with the performance of the equipment he handles.

So, in the fall of 1920, McBee set out to do this thing, and at the same time meet a public need that had been long felt, but which required too much capital to attract investors into it as a business by itself. He inaugurated the system of "Blue Bird Bus Lines."

The first line was established on what is known as the Poplar Pike, east from Memphis twenty-five miles to the village of Collierville. The equipment is a standard two and one-half ton Mack truck, fitted with a passenger body having a capacity for twenty-seven persons. The tire equipment is the Kelly-Springfield "caterpillar," mounted on Sewell cushion wheels.

In Memphis a regular starting station has been established on Court Square, right in the heart of the business section.

The bus makes two round trips daily—a total daily run for the equipment of 100 miles. The service is every day in the week, twelve months in the year—a total of 36,500 miles.



Home of the McBee Engine & Implement Co., Memphis, Tennessee

But the **big** thing about the line is that it runs **right on schedule** all the time. That's where McBee is hammering in his thought of continuous, dependable service.

For six months McBee experimented with the single line running to Collierville. The Poplar Pike was the best of the roads out of the city and the one most likely to bring the kind of information which would make other lines a success. For the greater portion of these six months the line did not quite meet expenses, but as the people came to know it as a regularly established means of transportation—always dependable, and always on time right to the minute—they commenced patronizing it more and more.

As soon as the Poplar Pike line had reached the stage where it would carry its own financial burden, another line was added to the Blue Bird flock. The second line goes to Olive Branch, Mississippi, a village about the same distance from Memphis as Collierville.

As can be noted by the accompanying illustrations, a portion of the operating cost is met by selling advertising display space on the sides and ends of the body. Inside spaces are sold, in the shape of cards of the regular street-car size and shape. This space has proved a most popular and desirable form of advertising, and no trouble is experienced in placing it on the regular basis.

The name of the equipment is most modestly placed, as will be seen in the photographs, but the mileage total—which is changed at frequent intervals—does get a lot of attention and creates considerable comment of a favorable nature.

It is interesting to note, too, that the running of these bus lines, over the roads connecting with Memphis, are having an effect of which Mr. McBee did not think when he launched the enterprise. The folks who ride these lines find them an accommodation and a convenience, but they do hate to be joggled to pieces over bumpy or worn roads. The road commissioner of their district soon learned something about letting roads get in such terrible shape. It is a matter of record that the roads upon which the Blue Bird bus lines have been established have received the greatest amount of attention during the past year, or since the lines went into operation.

So, the Blue Birds are building up a finer good-roads sentiment—and when the time for buying comes again there will be better roads in this territory for the trucks sold to travel upon. Any constructive work is cumulative.

The operating costs of the trucks and lines are kept very carefully from day to day, and will later be reduced to graphic form for the benefit of prospective purchasers. It may be interesting to note that the operating cost at present is approximately thirty cents per mile. This covers original investment, interest, depreciation, taxes, licenses, insurance, replacements, housing, gas, oil, and maintenance.

Eventually, as the lines become established on all the roads, it is expected that the Blue Bird Line will prove a very

ing originator of the plan, "is better than we expected, because we were willing to charge off a little loss in operation to the advertising value."

In some other sections of the country truck merchants have sought to bring their wares to the favorable attention of prospective users by the establishment of inter-city motor truck express lines. In many instances such plans have worked well, but to do this was not possible in the Memphis territory. First of all there are no large towns sufficiently close to Memphis to permit of the economical

operation of such an express service, and further, as this is practically a one-crop country, the hauling is all seasonal and with practically no return loads.

This condition was carefully considered before the establishment of the Blue Bird lines and the passenger carrying proposition decided upon as being the surest means of getting the greatest number of persons acquainted with the truck and its dependability.

At present the McBee company is not selling any

greater number of trucks in this territory than other reputable firms—but when the day for selling does arrive, as arrive it must, it seems altogether probable that the boys representing this line will have much easier sledding than those employed by the fellows who are now crouched over their desks, pulling out hair in large handfuls and cussing the bad business conditions. Thus the sagacious business man of present day stagnation builds for the day when normal business starts in again.

It is refreshing to come across a man who can look to the future and build for success solidly.



One of the Buses on the Blue Bird System, Operated Out of Memphis, by the McBee Engine & Implement Company



A Novel Advertising Stunt

The mileage figures are changed once each week

comfortable investment and will return equitable dividends. At present it is just breaking even—"but that," says the smil-

Management to Blame for Waste

In a report on "The Waste in Industry," the American Engineering Council's Committee has placed the responsibility for more than 50 per cent of the waste in industrial processes on management and 25 per cent on labor. The report met with much opposition before it was finally made public.

The committee outlined the following proposed program of governmental assistance to eliminate waste:

"A national industrial information service should be established to furnish more timely, regular and complete information covering current production and consumption and stock of commodities. A national statistical service should be estab-

lished covering employment requirements. A national policy regarding public health should be fostered and encouraged. The national program for industrial rehabilitation should be encouraged and should offer opportunities for education and placement to those having physical defects as well as those handicapped because of industrial accidents.

"A nation-wide program of industrial standardization should be encouraged in conjunction with industrial interests. The Government should recognize the necessity for a revision of such Federal laws as interfere with the stabilization of industry, and a body of principles should be accepted that could be developed for the adjustment and settlement of labor disputes."

Are Our 1921 Methods of

HIGHWAY APPROPRIATION, CONTROL AND REGULATION

of Recent Birth?

A Critical Study of National Highway Legislation, Herein Detailed, Reveals Many Interesting and Edifying Facts on the All-Important Road Problem

What the Townsend Bill Really Means to Us

By A. J. BROSSEAU, Member of the Highways Committee National Automobile Chamber of Commerce

ONE hundred and forty-five years ago while the colonists of America were still fighting for their independence, the Council of State of France entered a decree in which all of the highways of that country were classified into three groups, known as main, departmental and vicinal highways.

The main roads were to be constructed and maintained by the national government, the departmental by the various departments or provinces, the vicinal by provinces and municipalities. The selection rested with the body spending the money.

With this decree as a basis, work was begun and today, France has probably the most complete system of improved roads in the world as a result.

Patterned the French

While highways were of the utmost importance during the War of the Revolution, naturally, efforts were concentrated on those which were of vital need for military operations and it was not until some years later that our government approved plans for a national system which corresponded somewhat to that of France. But where France continued its plans, the advent of the railroad brought about an abandonment of ours and it is only today that a new form of highway transport has brought the United States back to a serious consideration of the highway question.

Curiously enough as our students have focused their attention on the problems here they have returned to a viewpoint identical with that expressed by the Frenchmen of the eighteenth century, and the measure brought before Congress by Senator Charles E. Townsend, chairman of the Senate committee on Post Offices and Post Roads, while expressed in modern language, contains much of the same thought as the old bill drawn long before engines existed.

In fact, could our legislators have copied the plan of France years ago we would not today be wrestling with complicated questions of administration and finances, and a continuous program of constant building up of highways would have done much to alleviate the damage done by the sudden impingement of modern traffic

upon green roads. As it is, we are faced with a tremendous task which will require a careful mustering of enormous resources if it is to be carried through quickly and economically.

That the task is worth while, no one who has watched the growth of highway transport will doubt. When we remember that twenty-five years ago there were just four motor vehicles in the United States and these were curiosities not carriers; when we know that today there are more than 10,000,000 vehicles plying their way along the highways; when we consider the vast possibilities of this new form of supplementary transportation, some idea of the task is gained. Customs and commerce are in the making, political boundaries are threatened, a new spirit of communication faces us. It is evident that the problem is one which can only be met by careful study and by thorough preparation for the future.

Question Not Local; National

In a word, to quote the report of the Senates committee on Senator Townsend's bill on this subject:

"A new era in transportation confronts the United States. An evolution of far-reaching social, political and industrial importance has been effected through the constantly growing use of highway transport. The modern motor vehicle has rendered obsolete old methods of highway construction, maintenance and administration. The question is no longer local alone in application; it is national. Obviously our highway policies must be broadened and strengthened to meet this changed condition if public expenditures are to be conserved and the best interests of the nation cared for. Living costs can be reduced, our defense strengthened, and a new spirit of nationalism created if we use intelligently this new means of communication between communities and states."

The question of how to meet this condition is one which has been under constant study for more than two years. Intensive consideration began when Senator Townsend introduced his first bill which, as he stated at the time, was done simply to set up a target for criticism and discussion.

On three subsequent occasions the Senator has modified his measure as the result of this criticism, while the Senate committee has twice held protracted hearings on it.

Today the bill reported out while, of course, not perfect, does present a practical step in advance which can be taken quickly and which will furnish the country with a road policy sufficiently broad to secure the best possible expenditure of national as well as of state and county funds.

It is perhaps not necessary to go into the provisions of this measure at length but since every man in the automotive industry is vitally interested in a sound highway development, a few of the chief points should be reviewed, in comparison with the existing law.

Federal Highway Commission Advocated

Thus, where the present act provides that the government shall distribute its funds to the 48 states for the use of the several departments, in the location and construction of roads subject only to a veto power which cannot be exercised upon the question of location, Senator Townsend, would provide for a Federal highway commission which, acting in co-operation with the state departments shall see that Federal funds are concentrated upon roads of primary interstate importance. These highways must be located with due regard for the agricultural, commercial, military and postal needs of the nation, which is a sufficiently broad provision to make impossible mere transcontinental highways cutting from coast to coast by airline as the demagogue would have the layman believe. They must further connect with the highways of adjoining states (something which the forty-eight state highway commissioners could scarcely be expected to attend to if the power were left to them) and where they have been constructed then Government funds shall be directed to secondary highways.

Drastic provisions for maintenance, a new formula for apportionment to public land states which, while not increasing the amount received by them, does give them more control over state funds than they now have; a provision that the state shall

meet government funds with state funds instead of impoverishing its counties by draining them of local road funds as at present; and a continuation of the present annual appropriations of \$100,000,000 are among the other important points. It is also worthy of note that Senator Townsend's measure specifically combines the road-making machinery of the U. S. Forest Service and the U. S. Bureau of Public Roads thereby decreasing overhead costs to a marked degree.

Like every measure, Senator Townsend's bill has attracted opposition which up to the present moment has confined itself chiefly to a charge that the bill is an automobile measure, the old appeal to prejudice when all else fails. That the statement is untrue is best evidenced by the fact that the Chamber of Commerce of the United States, the National Grange, the General Federation of Women's Clubs, the American Association of Engineers and a number of other large and influential bodies have endorsed the principles of the Townsend bill.

To date the one national body of any size which has gone on record as opposed to the bill is the American Farm Bureau Federation whose representative testified before the hearings of the Senate com-

mittee that they wanted government funds expended on farm to market highways first. The answer to this statement is perhaps best found in the testimony of the representative of the National Grange who said that he and every other farmer wanted the two miles of road past their farm improved first, naturally, but that obviously this was a county duty while national funds should be concentrated on the farm to market roads of larger use which was simply the state primary highways. Further he pointed out that a continuation of the road activity as a phase of the Department of Agriculture could not but adversely affect appropriations for strictly agricultural purposes in the future as the growing funds for highways purposes would so swell the total for the department as to make it appear that agriculture was receiving more than enough funds.

At the present moment, the Townsend bill is on the calendar of the Senate where it may be called out for debate at almost any time although it now appears possible that no serious measures will be debated by the Senate prior to the recess which it is anticipated will be taken shortly.

The fact, however, that Federal Aid appropriations expired June 30 and that

the sixty-day saving clause comes to a close September 1 makes action necessary and for this reason every effort is being made to secure it by Senator Townsend.

The Townsend bill was not introduced in the House where the only bill under consideration was the so-called Phipps-Dowell measure. This is a continuation of the present form of administration although some concession is made in the clause which provides that funds shall be concentrated on seven per cent of the highways of each state. The bill does not provide for appropriations of any kind and in fact, there has been some sentiment of opposition to them in the funds as the result of the national demand for economy.

For this reason, a good many Congressmen voted for the measure when it was debated recently in the expectation that the Senate would pass the Townsend bill and the two measures would be whipped into shape when in conference.

National interest in the outcome has been keen but unless this is demonstrated in the form of communications to members of Congress it is ineffective, hence it is suggested that those who believe in sound highway development should not delay in presenting their viewpoints to their Senators and Representatives.

Distinctive Delivery Trucks

THE use of the truck as a medium of advertising offers a broad scope for original schemes to the man who appreciates the appeal of the unusual and unique. The cars illustrated are seen daily on the streets of Seattle, Wash., where they never fail to attract attention. From the standpoint of effectiveness and economy, they are in a class by themselves. Employment of an unusual body only adds a trivial sum to the original cost of the chassis. It costs nothing in upkeep; and does not in any way detract from the practicability of the truck.

One of the most unique delivery cars is the cup and saucer model used in the Commissary Department of the Northold Inn. This is an exact reproduction of the cup and saucer served at the Inn, even to the fragrant aroma of coffee ensuing from it. The olfactory effect is achieved by a trick outlet for the exhaust. The monogram is illuminated at night, enhancing the artistic effect. The car was designed by Clare S. Colegrove, pop-

ular Seattle restaurateur, who was one of the first to adopt this unique method of advertising.

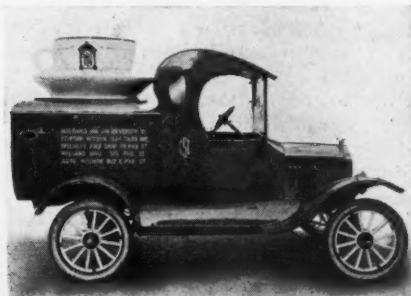
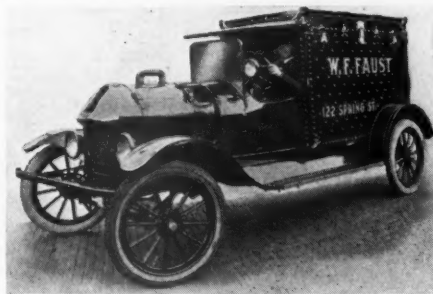
That so mediocre a product as a loaf of bread may become a distinctive advertising feature is aptly illustrated in the truck used by the Chauncey Wright Restaurants and Bakeries. Perhaps the most attractive model in perfection of detail is the car used by the Faust Trunk Co. Even the radiator is so effectively disguised that the car gives the appearance of a trunk and grip mounted on wheels.

W. J. Faust designed and executed this model.

Consistency of outline and brilliancy of coloring makes a striking appeal for a huge can of Federal Milk on another chassis. It is an exact replica of the familiar household commodity. It was designed by J. Clifford, of the advertising department of Federal Milk Co. The eternal appeal of the unusual insures the progressive merchant that this mode of advertising is successful, as well as distinctive.

Exchange Rates Prevent American Trade in Algeria

Unfavorable exchange rates are said to interfere with the sale of American trucks in Algeria. The country has excellent roads, but prefers the French car in preference to one from the U. S., because of the absence of custom duties. Nearly all the gasoline used is imported from the United States.



Vision Takes Advantage of Every Opportunity; Numbers Have Reduced the Truck to a Mere Transporting Medium; But Individuality and Originality Still Strike Conspicuously the Eye of the Observer

Are We Giving

OUR EXPORT BUSINESS

Serious Attention?

Various Fundamental Factors Entering Into Our Present Day International and National Economic Scheme Are Clearly Defined by Mr. Hoover. His Message is Suffused With Sane Optimism

HERBERT HOOVER, Secretary of Commerce, in a recent address before the National Shoe and Leather Exposition and Style Show brought out many interesting and enlightening facts and comparisons about and between the United States and foreign countries, particularly European, in an effort to bring home to American manufacturers and merchants foreign trade possibilities. The entire address is suffused with optimism on the trade future of this country in both its domestic and foreign phases.

He declared that the country has successfully passed through several depressions since the Civil War, and that we have already passed the corner of this one, speculation and waste are waning, prices are rapidly striking a scale of permanency, labor is regaining efficiency and the prospects over the entire country are indicative of much better sailing in the near future.

Encouraging Predictions

Taking his views in brief, he said that our food exports should remain on a greatly enlarged scale, demand for our raw materials should slowly increase toward pre-war amounts, manufacturers should be able to hold special fields of production and ingenuity, although it will be necessary to fight in order to hold our markets in competition with European manufactured merchandise, and that the world credit situation does not present disturbing or difficult problems.

Secretary Hoover said:

"Our whole standard of living greatly depends upon our imports and that exports are the balance wheel for our production. Exports are vital to the stabilization of our industries, of price levels, of wages, and of employment. We generally export 20 per cent of our wheat, 60 per cent of our cotton, 75 per cent of our copper, not to mention others. Unless we find a market for the surplus production of our great industries, we shall continue to keep some 25 millions of our people in reduced buying power. We might even drive them into poverty during the many years that would be required to shift the whole basis of our internal production. Nor does a nation become rich by its exports alone, but by its trade.



Look at It Through the Right End and Get the Business

"While many of the causes of the present depression lie within our own borders, yet there may be no recovery from these hard times for many years to come, if we neglect our economic relations abroad. Our sole defense is the prosperity of our neighbors and our commercial skill. The recovery of our foreign trade can march only in company with the welfare and prosperity of our customers.

World Changes in Production and Markets

"When we analyze the present foreign trade situation, we find tremendous shifts in economic currents since 1914. Indeed, we find great changes still in progress.

"There have been great changes in our own economic situation. We have not alone shifted from a debtor to a creditor nation, but our capacity for surplus production in food and manufactures has grown enormously during the war until we have taken front rank of the world in foreign trade. During the last year about one-half of our whole foreign trade was with Europe, but of our exports to them 80 per cent were foodstuffs and raw material; of our exports to states outside of Europe about 75 per cent were manufactured goods. Europe in turn is our serious competitor in marketing of our manufactured goods to the rest of the world.

The Non-combatant Countries

"Since the Great War began, the world outside the fighting states of Europe has

gained mightily in consuming power. Even omitting the United States, it has gained something like forty millions in population. The countries not directly affected by the war are indeed suffering from the general depression, but this depression with them is only the aftermath of the malevolent forces born of the past war booms. They have none of the deep economic wounds of the fighting states, and they will be quick to recover. During the war the productive capacity of these states, except possibly Japan, had no unusual increase, because of their isolation through shortage of shipping.

"One of the economic shifts that affects the whole world profoundly is from Russia. Russia was one of the great food bases of the manufacturing countries of western Europe, exchanging food for their fabricated products. These manufactured goods in turn were to some degree produced from our raw material. Even at best it will be many years before Russia will have recovered. Europe will draw from us a great proportion of food supplies that she formerly drew from Russia.

Germany and Reparations

"Another great, but uncertain, shift in world forces will arise out of Germany. The reparation payments must have a profound effect upon the whole economy of the world. Germany is to pay outside her borders to the Allies \$500,000,000, plus 26 per cent export duty, or, say, a minimum of about \$750,000,000 per annum. Germany is left without much gold foreign property, or foreign business earnings of consequence; therefore, these payments must be made mostly by the sale of manufactured goods outside her borders. But beyond the reparation payments, she must also sell goods abroad in the amounts necessary to buy her imports of food and raw materials. Any calculation based on the pre-war trade of Germany implies an enormous increase—perhaps more than doubling—of her pre-war exports. In view of the export duty and other payments, she must produce these goods for about one-half our production cost in order to take our markets.

"Such an increase in exports must be manufactured goods, and until the world consumption grows, these must be mar-

keted in displacement of the goods of other industrial nations. We shall certainly feel the effects of this flow of goods that must be produced if she is to make reparation payments. On the other hand, Germany must take more raw materials from us for this purpose. In any event, the crowding in the market of German exports will affect her immediate neighbors more than ourselves, for 80 per cent of her market, pre-war as well as in the future, must lie in Europe itself.

The Effect Upon Us

"Any improvement in European production of manufactured goods will favorably affect our market for those raw materials much as cotton and copper, where we possess the final supplies. We must expect a less than pre-war consumption in the confines of Europe for their manufacture of our raw materials. But on the other hand, they will find after this depression is passed that the markets of the rest of the world are larger than before the war. I am confident they will gradually return to pre-war demand for our cotton, copper, etc. Fortunately, our producers have realized this temporary situation and have vigorously reduced their production so that they should eventually realize better prices than at present.

"It seems to me that it was inevitable that the balance of the forces at work in Europe would improve their ability in competitive manufactured goods. Their production costs were bound to be low, both by better organized industry and by lowered standards of living. Some of them are today through Government subsidies, artificially low, but will increase.

"If we are to hold to our foreign markets

in this vast group of our manufacturers, and thus keep our people employed, we have several things to attend to. Fundamentally, we must get our production costs down. The surest road to a continued high wage, and the surest safeguard against unemployment is to remove every restriction on effort. This must extend from our mines to the railways, to the factories, to the wharf, and to the ship. It means smaller margins of profit. It means that ultimately we must have much lower transportation rates. It means we must have better organized marketing machinery abroad under Americans themselves. It means the establishment of adequate short-time credit machinery and much more care in foreign credit risks than our merchants have shown in the last 12 months. It means the Government must remove as quickly as possible those unnecessary domestic burdens upon commerce to which the Government is a party, by the reorganization of our tax system, the settlement of the tariff question, the reduction in Government expenditure through the reorganization of the Federal Government, through reduction of armament and through reduction of Shipping Board losses and by the settlement by the Government of the outstanding claims of our railways. It means we must cease trying to drive American ship owners off the sea with tax-paid shipping losses. We must carefully determine what particular trade routes we will maintain in development of our commerce over a period of years, and let our merchants know them. It means the Government must provide such information to commerce and industry, from both at home and abroad, as will enlarge its judgment. It means we must

extend scientific research into the problems of waste, the perfection of processes, the simplification of methods that are beyond the ability of one manufacturer acting alone, and we must co-operate with industry to perfect these things.

No Bar to Prosperity

"All of my rightful and optimistic view that we will maintain the flow of our goods is based upon the assumption that we can wisely manage these credit problems. There is a general agreement that we must extend credit if we would market our surplus and upbuild our customers during the years of readjustment.

"As necessary as the continued establishment of foreign credits are, if we are to maintain our large volume of export trade, we should not over-estimate the amount needed for legitimate trade for refinance and for reconstruction purposes. The amount is not so great as popularly supposed and will annually decline. I believe all trading states of consequence in the world can even now finance their imports of food supplies. The stronger of them can finance their imports of raw materials.

"There are, indeed, many complexities arising out of our great expansion on productive power and our suddenly born creditor position. I do not need say that we are confronted with a hundred difficulties, that we must be alert to steer our commercial policies against the winds of the world in an economic storm. While our recovery may be slower than some may expect, nothing can prevent the prosperity of a country where the people have enlightenment, wish to work, wish to produce, and wish to do right by their neighbors."

COST AND GENERAL INFORMATION ON MOTOR TRUCK OPERATION AT THE MINES

Extracted From a Lecture Delivered by F. W. FENN, Secretary National Motor Truck Committee

THE large demands of commerce, heightened by the increase in the population and the number of new communities, necessitates a method of coal and ore extraction and conveyance at the mines other than that afforded by manual or animal labor. To this end it is customary to motorize, particularly in the mining of coal, all the processes of extraction and conveyance.

Coal Mining

There are about 4000 coal mines in the United States. About 2000 have railroad connections, but this does not mean that these 2000 have no use for trucks, since many other things in addition to coal must be transported. Operators who handle large tonnage of coal almost always have railroad connections at the mines and are

equipped to load directly into the freight cars for transportation of their products to required points. On the other hand they may supply local needs. With motor truck equipment it is possible to increase the radius of the term "local" to about 50 miles, reaching points with which they have no direct rail connections, also reducing loading and unloading expense.

Coal mines are usually located some distance from the local freight depot or supply stores. They require large quantities of supplies, such as shovels, picks, jackhammers, drills, mine machinery, pipe, mine props and timber as well as repairs which are received in less than carload shipments and must be transported from the local station or store to the mines. The 2000 coal mines that do not have railway connection should, regardless

of tonnage, closely investigate the motor truck as their business is nothing more than a transportation problem and might be increased by the use of motor trucks.

Mine Owners Turn to Trucks to Reduce Costs

In order to make delivery fast and sure, the mine owners are now turning to trucks.

They clearly show a great saving not only in time but in expense of handling coal from the mine to the car. An average cost of coal production at the present time when handled by teams will perhaps, be interesting. These costs vary considerably with the location of the mine and the facilities it has for handling the coal.

	Average Cost
Mining 1 ton of coal.....	\$1.50
Hauling to mouth of mine....	.15
Hauling from mouth to car, including shoveling into car...	1.50
Royalty .....	.15
Overhead .....	.25
Total Cost per Ton	\$3.55

Trucks Lower This Cost \$1 or Approximately 28.2 Per Cent

If instead of team and wagon, a 2-ton truck is used, all items (such as operating expenses, drivers, depreciation, insurance, license, etc.), will cost approximately \$19 per day, or less, and could haul a minimum of thirty-eight tons per day. It will be seen that the cost per ton would be 50 cents instead of \$1.50. This cost will vary in each case according to the distance to be hauled and the facilities at either end for loading and unloading the coal.

Iron Ore, Copper, Lead and Zinc

We have about 400 iron mines in the United States. Their requirements for the use of motor trucks are about the same as in the coal mining industries, except that the ore is shipped to smelters or iron and steel mills and not used locally in its raw form.

The methods used for mining copper, lead and zinc are alike, and often these ores are found in the same mine. There are about 2400 mines in this Group, all having more or less use of the motor truck. About 75 per cent of the operators have to transport both their products and supplies to and from the local station or supply store. The amount of supplies and machinery required for mining and milling these ores is much greater than that required for mining iron and coal of equal tonnage, as the operation is more difficult.

Gold Deposits

Loaded from hoppers or bunkers the motor truck, having no physical limitations easily surmounts all these difficulties and automatically dumps the gold ore into storage at a minimum cost per ton. Where runs of low grade ore are worked, transportation by other than trucks renders profitable mining impossible. Trucks engaged for this work are usually equipped with steel dump bodies operated by a hydraulic hoist.

Equipment

The superiority of the motor truck over the team is revealed by the fact that the former travels 100 miles in a day (2 round trips of 50 miles each) delivering an average of 15 tons, while the team hauling 3 to 3½ tons, requires 4 days, under favorable conditions, to make 2 round trips. At the conclusion of this period of service the machine is as fresh as at the start, while the team is worn, incapable of further efficient service until it has recuperated.

Unloading Principles

The utility and economy of the power truck are especially evidenced in unload-

ing coal. By means of a hydraulic hoist operated by the motor in the vehicle, the body of the conveyance is raised to an angle of about 40 deg. The coal thus is propelled by force of gravity through apertures at the rear and the bed is emptied usually in 30 seconds. To facilitate unloading, motor wagons also are designed so that the coal may slide through side or corner exits. These modes of unloading are applicable where there are manholes or other means of entrance at destination. Power trucks generally are equipped with iron or steel chutes of various lengths, one end of which is attached to the vehicle and the other inserted at the point of ingress.

Extraction of Granite

At the Davidson properties in Atlanta, the granite is being taken out of a knoll of rising ground, where it crops out close to the surface and is transported to the cutting sheds and the crusher, which are located on a spur track of the Georgia railroad. For convenience in loading and unloading, the truck has been equipped with a platform body, on which are placed removal boxes (called boats). Each box is fitted with iron rings, to which the chains of a derrick hoist can easily be attached. Much of the truck's work then consists of hauling granite in irregular shapes. As the granite is quarried and split, it is loaded directly into the removable boxes on the truck and hauled to the crusher, where the boxes are lifted by a derrick and dumped. In the hauling of larger stone (building blocks up to three to five tons) and curbing, the boxes need not be used. The material is loaded directly on to the platform bed of the truck body.

Typical Mining Operation

A typical mining problem that will be encountered in the field is here presented. The mine in this case is located 84 miles from the railroad spur. The material consists of copper and zinc, which weighs approximately 115 lb. per cubic foot. It will be handled loose. It is expected to handle on an average 100 tons a day, with possibilities of 50 per cent over production.

The mine is at 9,000 feet elevation, while the spur is about 6,000 ft. The roads are in good shape and dry quickly. Several thousand dollars will be spent to put the road surface in good condition and reduce grades so that none exceed 7 per cent.

Loading the trucks will be done from an overhead bin. Unloading will be accomplished by dumping. The truck will dump its load into a hopper, which in turn can feed a freight car. This will require the truck to run up on an overhead trestle. Unloading may also be done by laborers. Two men would require from 30 to 40 minutes to unload one 6-ton load of ore. If the trucks travel in daylight this unloading would have to be done at night in order not to hold up the trucks on their return trip. Supplies to be carried on return trips will be extra and will reduce the cost of handling out-

going loads depending on the incoming amount.

Based upon these conditions you should be able to determine the following costs:

- (1) The approximate cost per trip of 168 miles would be \$86.46.
- (2) The approximate cost per ton with one way load on a 6-ton basis would be \$11.41.
- (3) The approximate cost per ton with 50 per cent return load on a 9-ton basis would be \$7.61.
- (4) You should recommend that 6-ton trucks be used which would be equipped with horizontal hoists and dump body of 122 cu. ft. capacity.

Summarily, the economical uses to which the motor truck can be put in mining are as follows:

- (1) Hauling, in the case of coal, from mines direct to consumer, where conditions make it possible. This releases coal cars for shipments to points at greater distances than the motor truck working radius.
- (2) Hauling of ores from mines with small production to the railroads for shipment.
- (3) Hauling away the top earth when stripping for an open mine.
- (4) Hauling supplies, machinery and repair parts from local station or supply store.
- (5) Hauling mine props and timbers from nearby timber land or other source of supply.
- (6) Hauling commissary supplies where a commissary is maintained.
- (7) Mine rescue work when emergency arises.
- (8) Transporting employees to and from mine.

Yellow Cab Has Summer Camp

The Yellow Taxicab Company, Chicago, one of the largest operators of motor vehicles in the West, has leased a forty-acre tract of timber on the Illinois River, between Yorkville and Oswego, which will be utilized as a summer camp for employees. Tents have been erected and other comforts of camp life provided. The run to and from the camp will be made in the extra rigs of the company and employees and their families will be permitted to spend several weeks each year at the resort. It is expected that fully 2,000 employees will take advantage of the opportunity. It is proposed to improve the resort, a bathing beach to be a feature. There will also be a dancing pavilion, baseball grounds, tennis courts, and other attractions. The consideration shown by the company for the pleasure of employees and families is as rare as it is appreciated, and the camp has done much to cement the good fellowship between the corporation and the men in its service.

Receipts for Better Business

"Stir the Soil"

To the Editor:

I am in receipt of your good favor of recent date and have noted your desire that, with others, I should contribute to an attempt at dealer awakening for the fall trade and wish that I might be able to offer something from a new angle that might attract more attention and sink in deeper than usual.

Frankly, I think that it is time that manufacturers, representatives, publishers, and in fact every one having to do with the truck industry, should now cut out the froth and foam and extraneous stuff and get down to hard pan and stay there, if they would serve all interests best.

The truth, candidly told, is sorely needed throughout the entire trade, and I, for one, would like to see such a reform ushered in NOW.

As to the concrete suggestions asked for:

I once heard a noted lecturer on farming and horticulture say, that if he had to preach a sermon on "Raising a Crop" and do it in the shortest time and least words, he would use only three, viz: "Stir the soil."

Likewise, I might say to the dealer, if you want to make truck sales, "Stir the soil."

Not on the surface only, but dig down deep after every prospect in the territory, making a store to store, office to office and factory to factory canvass, to get a complete list of possible truck buyers.

First of all, I would say, that the dealer who would be successful must first come to a full realization of what the present changed conditions mean in the truck as in every other business.

He must feel that he now has to sell instead of being bought from.

To do that he must study and know truck construction, both as to his own line and competition, and be able to accurately discuss adaptability and values with his prospects.

Moreover, he should study and know truck transportation sufficiently well to be able to recommend the right size and type of unit for a certain use, rather than make a guess and recommend the wrong thing, thereby possibly upsetting his chance for doing business.

If he does not know what is best to offer, and that we dare say will often times be the case, he should instead of committing himself immediately, say that he will submit his recommendation within a few days, and in the meantime he can get the necessary dope from his factory, provided they are capable people and on the job.

Having listed all prospects as to business, a campaign of presentation should be carefully laid out so that none of the advantages of truck over horse-drawn, or ownership over hiring will be overlooked.

Each business should be concentrated on, if possible, until all known prospects are seen.

Calls should be followed with suitable letters and literature and the help of the dealer's factory connection should be enlisted through the Promoting Department to further the marking of a sale.

In attempting to sell any particular line of trade or industry, the representative people in it should be picked out for first calls.

By so doing the dealer can usually learn more of value regarding hauling conditions in that line than could be done from others less representative, and in case a sale ensued, the use of a truck by such representative people would add some local prestige for further sales.

Dealers everywhere have been given such indisputable statistics regarding the future possibilities of the truck business that I believe it unnecessary to repeat them here.

They should, however, gather such data together where it can be studied ensemble and not piece meal, when such a new vista of possibilities will certainly appear as should convince any live dealer as to what he can accomplish if he only went after the truck possibilities of his section "hammer and tongs."

Expert statisticians tell us that there has only been a fifteen per cent average decline in demand for all commodities, and since deflation has been well accomplished, Federal bank reserves are very large, crops are turning out so abundantly, unemployment is being reduced and disturbing world conditions generally are being satisfactorily adjusted week by week, with constantly increasing confidence on the part of every one, it only remains now for every one to push his own business when the ball will continue to roll faster and faster until normal trade is again fully restored.

The condition now is psychological.
Work will turn it into real business.

A. E. SCHAFER,
General Sales Manager.
The Gramm-Bernstein Motor
Truck Company.

Why the Motor Truck Dealer is entitled to a Profit, and why he must get list prices, is emphatically told by a prominent distributor in our September issue. This interview, written by A. V. Comings, will give the dealer something to think over seriously. Don't miss it.

If You Dig Hard Results Will Follow

To the Editor:

Having been out on the road for practically the past six months in many sections of the country, I can state to you as an absolute fact, that by digging hard for business, results have been accomplished; where it was stated no business existed.

Therefore, my motto is, keep full of pep, have a lot of confidence, work harder than ever before, and keep plugging and digging. If you do this, you will get business, and you will be surprised at the results.

Business is looking better in all sections of the country, and we have found out positively the following:

1. That our dealers that are working hard are getting business.
2. That the dealers that are not working, are not getting business.
3. In which class do you belong?

Salesmanship, real salesmanship has come into fashion again. The day of the "order taker" is over, so get your feet out of your office, stop talking hard times; hot foot it up the streets and down the alleys and by-ways and hustle for business, and you will find many concerns who want motor trucks of whose very existence you have been unaware.

Keep your tail off the ground or it will be stepped upon by some hustling salesman on the way to secure an order for motor trucks from one of your own customers. Go out after the orders, put jazz, pep, ginger into your efforts. Burn the crepe and jump on the crepe hangers with both feet; wear out the shoe leather and you will get business going right, and if you do not dig for business somebody else will get it. It is up to you.

Keep your face smiling—The present condition is the best thing that could happen to America, because it means return to a natural condition.

Confidence will restore good business conditions—Spend your entire time trying to do business—Be a booster.

Go forward and make up your mind to go over the top—Keep busy, and gloom and discontent will disappear; and success will follow.

FORREST J. ALVIN,
General Manager.
The United States Motor
Truck Company.

Trucks Adopt Remy System

It has been announced that the Stewart Motor Corp. of Buffalo, and the Denby Motor Truck Co. of Detroit, have adopted Remy systems.

The Stewart equipment consists of a Remy generator, coil and distributor. On the Denby trucks the Remy units are composed of a generator, starting motor, combination lighting and ignition switch, a starting switch, and the new high-tension magneto.

Standard Bodywork in Europe

Although standardization has inevitably become general in chassis construction in Europe, for body construction it has not made the same advances as in America. Nevertheless, such methods are rapidly being adopted, and it is being found that thereby renewals are facilitated and cheapened. A good instance of this is afforded by the examples of the bodywork now made under standardized system at the Arbon works of the Swiss firm of Adolf Saurer.

Pitch pine is used for the framing, the paneling of which is made up of narrow-tongued and grooved boards each separately detachable and renewable in the event of damage, and each part, as for example, the sides, front, back and cab are each made up as separate units.

The views below show unusual features in design and construction, unique, though practical, method of packing away into storage tools and minor repair parts, and manner in which component parts of the body are assembled.

To Test Claims Made by Fuel Company

Upon application for the issuance of a complaint, the Federal Trade Commission has, as required by law, the public interest appearing, cited Chemical Fuel Company of America, Inc., Louisville, Ky., in complaint of unfair competition in the sale of a motor fuel in interstate commerce. Thirty days are given the company in which to file answer to the complaint.

According to the complaint, this company sells a motor fuel known as Tri-oxyalene, which, it is stated, is advertised as having been thoroughly tested by the U. S. Government Bureau of Mines, and has fulfilled every claim made for it as a fuel for all classes of air craft, sea planes, etc., and is the most perfect automobile fuel.

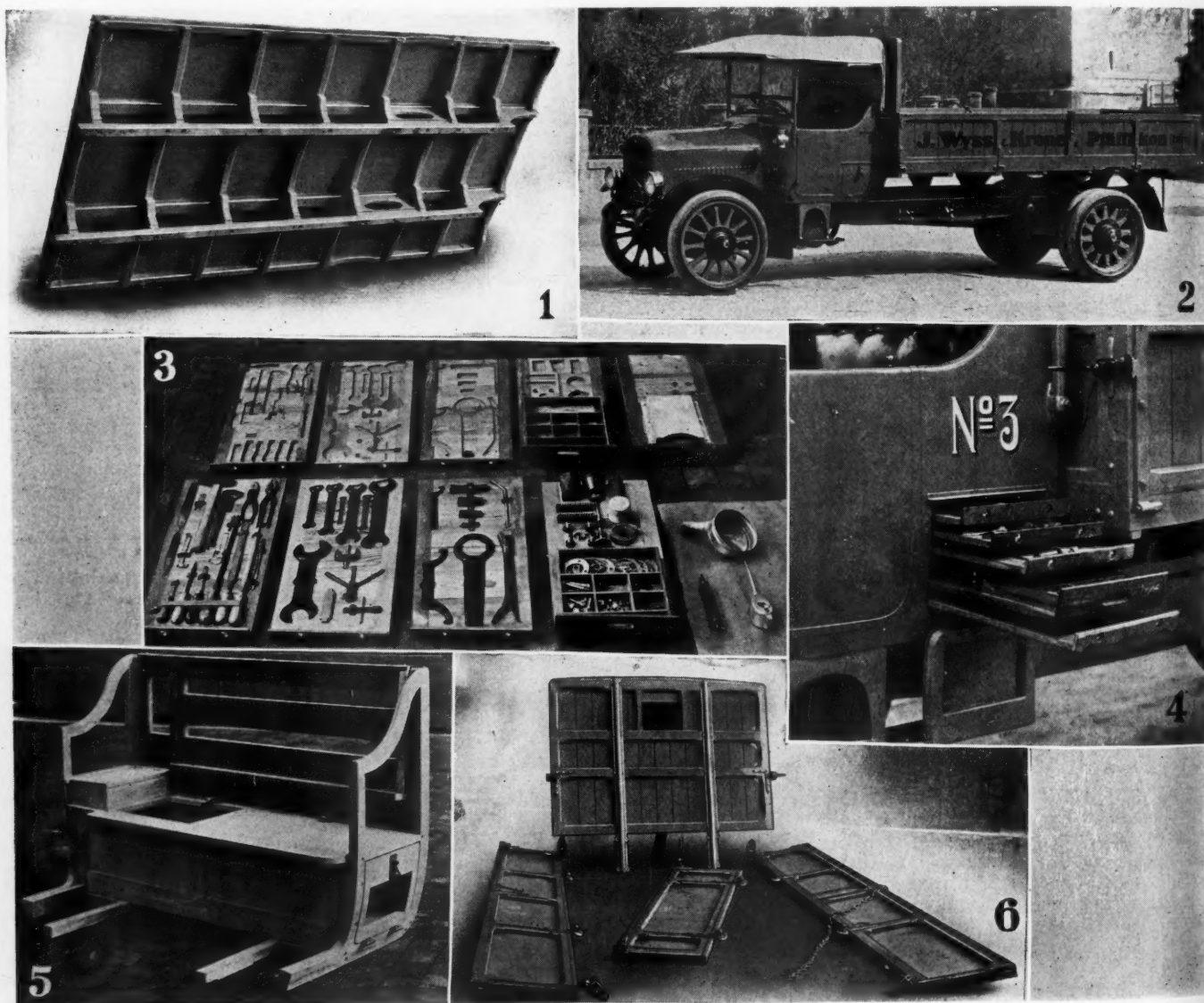
The complaint alleges that these representations are false and misleading in that no official test of Tri-oxyalene has been made by the Bureau of Mines, and

that chemical engineers in that Bureau who made unofficial tests of this product did not regard it as having any commercial merit, or being of scientific interest.

This citation is made after a preliminary inquiry, and initiates a proceeding to try out the case on its merits, the hearings to commence on August 31st.

Small But Most Influential

The Weber County Automotive Dealers' Association, of Utah, has elected L. L. Hains, of the Ogden Motor Car Co., Ogden, Utah, chairman, and N. C. McConnell, secretary. This organization has a membership of only eight dealers, yet the members get together once a week and would not think of letting their association disintegrate. In the past year the association has saved its eight members over \$40,000 on credit information alone, which is one of the big reasons this and other associations ought to continue in business.



What Europe is Doing in Modern Body and Cab Work

No. 1. The underframing of loading platform is as light as access to the chassis will permit. No. 2. The result when body units are combined with the chassis. This private auto form of driver's seat is very popular on the continent. Nos. 3 and 4. A very convenient feature at the front is the trays of tools under the driver's seat. No. 5. The framing up of the seat. No. 6. Sides and back of cab are framed up separately.



EDITORIALS



Can the Banker Help?

FINANCIAL students and those closely following the trend of business conditions feel convinced that if the banker would be a little more liberal with credit at this time business would come back much faster. The banker is criticised for precipitating a run on business and for piling up reserves, when what he should do is to lend more freely so that legitimate concerns could go ahead with intensive sales and publicity programs, instead of simply marking time.

It seems that the banker is willing to lend money freely when times are good and prices are artificially high, but when business is below normal his tendency is to keep the purse strings tight.

On all sides we hear the statement that the country has plenty of money, and that this country possesses nearly half of all the gold in the world. Banks with few exceptions are now in excellent shape. The strenuous deflation program started over nineteen months ago has had its effect.

The question is: Will the pendulum swing too far the other way? Isn't it about time that the banks take the right angle on the situation and reverse their practice of being good fellows in good times and instead become goods fellows in sub-normal times? The merchants who need credit at the bank these days should have it, provided they have a legitimate right to it. The banker should exhibit more courage and confidence.

There are many dealers, however, who believe that the banks have not given them a fair deal or that they are discriminating against them or the motor truck industry in general. We hardly think they have cause for complaint because we do not believe that the average bank will refuse to extend credit to any concern that can honestly show that it has need for money or that can show the bank a business statement which indicates on the face of it that the dealer is keeping an accurate account of his business transactions, and who can estimate within a reasonable degree of accuracy what his future requirement will be. Many dealers have been refused credit not because they are not rated as reputable characters but simply because they have not been able to present an accurate statement to their bankers. The banker demands facts and not

guesses. Show him a clean slate. He is scrutinizing every loan carefully these days, and although he holds the purse strings his discriminating attitude is justified. He is duty-bound to be conservative. Any other course would simply revive the artificial high prices under which the country has been laboring. The aftermath of the war cannot be rectified within a few years. It will take a little time to change the country's methods of doing business but it will be worth striving for the results.

Will Dealers Dictate the Terms?

WILL the time again arrive when the factory invites its dealer to a sort of family reunion and whilst glorifying the inner man, extract hastily made pledges for a certain number of trucks? Will production schedules be made up over night, as it were, with faith in Providence that the trucks will be sold some way or other?

A hundred times—No!

The manufacturer who survives the precarious times now facing the motor truck industry will have learned one lesson; namely, that production will have to keep closely in step with sales. In fact, a shortage will be looked upon with less disfavor than over production, and the dealer will be required to estimate his needs more closely than he has in the past and the manufacturer will do well by discounting these estimates instead of increasing them.

The time may come when trucks are ordered or sold a few months ahead. Locomotives and steamships are not standing around in show rooms waiting for someone to drop in and buy them. Transportation units such as the motor truck cannot be forced upon the public. The motor truck does not belong to the "wrap it up and take it with you" class of merchandise. There must be a need for every truck sold and that need must be thoroughly analyzed from all angles. In the future we shall find production schedules fluctuating from week to week and statements to the effect that "such and such factory is producing so many trucks a month" will be considered with skepticism by those who are thoroughly familiar with the law of supply and demand. Production will go hand in hand with demand.

GET YOUR PROFIT—SELL YOUR TRUCKS AT LIST PRICE

News of the Trade in Brief

Intensive Salesmanship Campaign Inaugurated by A. E. A.

The Mackinac Island convention of the Automotive Equipment Association held in July was the birth-place of an idea which may mean the complete rejuvenation of the automobile industry. This idea, a sales promotion campaign to start sensible buying and to break down sales resistance, has underlying it, one axiom "hard work."

During the meeting a delegate from Massachusetts offered the following resolution:

"I move you, Mr. Chairman, that the delegates assembled, do hereby pledge that insofar as it is possible, their organization will co-operate in making Saturday, August 6th, 1921, the manufacturers' and jobbers' Sales Promotion Day, and further will, by every means possible, instruct their salesmen on the sales work as outlined at this convention and further agree to make the week of the eighth following, a National and International Sales Promotion Week and carry to dealers and garagemen, the sales promotion idea through their salesmen, in their advertisement and personal contact to assist, to the best of their ability and resources, and urge them in increasing sales to the consumer."

This resolution followed the order unanimously and enthusiastically adopted by the association on Sales Promotion. It was decided a good way to increase sales was to suggest that the various dealers and repairmen offer a commission of 5 per cent in addition to the regular remuneration, to their salesmen or workmen on all sales made by them of automobile accessories or equipment.

This sales day and sales week is the fore-runner of a twelve-month intensive sales campaign which will have for its object the better retail selling of automotive equipment. To launch this great campaign the association voted \$40,000 as the first appropriation, this sum being made up of \$15,000 from the treasury and an assessment of \$50 per member, payable immediately. The sum will greatly exceed this amount as the plan progresses.

No better guarantee of the success of the movement could be asked than is shown in the selection of the committee of manufacturers and jobbers: R. A. Stranahan, Howard W. Dine, Louis Safford, N. H. Oliver and W. W. Low. On instruction from the convention, Ray W. Sherman, formerly editor of the Motor World has been engaged as manager of the sales promotion plan and will be given the title of Merchandise Director.

There is no doubt but that the plan will be a big success as it has the indorsement of some of the biggest men in the industry. The A. E. A. members are taking the matter most seriously and each will lend his aid in promoting the plan.

Coming Events

SHOWS

- August 29 to September 3, 1921—Milwaukee, Wis. Annual Fall Automobile Show of the Milwaukee Automotive Dealers' Association at the Wisconsin State Fair. Bart J. Ruddle, Sec., Brumder Bldg., Milwaukee, Wis.
- September, 1921—Topeka, Kansas. Truck Show at Motor Hall, Topeka Fair Grounds.
- September, 1921—Sacramento, Cal. Seventh Annual Show during State Fair. Automobile Tent (30,000 sq. ft.). Passenger Cars, Trucks, Tractors, Accessories and Agricultural Implements. State Agricultural Society, Sacramento.
- September 6 to 10, 1921—Indianapolis, Ind. Auto and Accessory Show, under the auspices of the Indianapolis Auto Trade Association. John B. Orman, Mgr.
- September 12 to 17, 1921—New York City. Seventh Annual Exposition of the Chemical Industries, Eighth Coast Artillery Armory.
- September 28 to October 8, 1921—New York City. Electrical Exposition, at 71st Regt. Armory, Park Ave. & 34th St. Exhibit will include electric vehicles. Address: Norman Maul, 130 East 15th St., New York City.
- October 10 to 15, 1921—Indianapolis, Ind. Industrial Exposition at the Indiana State Fair Grounds, under auspices of the Indianapolis Chamber of Commerce.

CONVENTIONS

- Atlantic City, N. J., October 19 to 22, 1921—Fourth Annual Meeting and Exhibition of the Automobile Accessories Branch of the National Hardware Association of the United States, at the Million Dollar Pier. T. James Fernley, Sec., 505 Arch St., Philadelphia, Pa.
- Boston, Mass., September or October, 1921—Tenth Annual Congress of the National Safety Council.
- Chicago, Ill., October 12 to 14, 1921—Annual Convention of the National Implement and Vehicle Association. H. J. Samiet, Sec'y, 72 West Adams St.
- Chicago, Ill., November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Association at the Coliseum.
- Cleveland, Ohio, October 18 to 20, 1921—Convention and Exhibit of the National Tire Dealers' Association, Hotel Winton.
- Detroit, Mich., September 14 to 16, 1921—Annual Credit Convention of the Motor & Accessory Manufacturers' Association at the Hotel Statler.
- El Centro, Calif., October 17 to 18, 1921—Southern Division Meeting of the California Automobile Trade Association.
- Elkins, W. Va., November 8, 1921—Semi-Annual Meeting of the West Virginia Automobile Dealers' Association.
- Greenville, S. C., December, 1921—Semi-Annual Meeting, South Carolina Automotive Trade Association.
- Lansing, Mich., August 30 to 31, and September 1, 1921—Annual Convention of the Michigan State Good Roads Association.
- Lake Tahoe, Cal., August 15 to 16, 1921—Northern Division meeting of the California Automobile Trade Association.
- New York, N. Y., August 21, 1921—Clam Bake of the Automotive Service Association of New York at Karatonyins', Glenwood.
- New York, N. Y., October 5 to 6, 1921—Twelfth Annual Convention of the American Manufacturers' Export Association at the Waldorf Astoria. A. W. Willman, Sec., 160 Broadway.
- New York, N. Y., November 22, 1921—Convention of the Factory Service Managers, National Automobile Chamber of Commerce. Address, Marlin-Rockwell Bldg., Madison Ave. and 46th St., New York City.
- New York, N. Y., January 11 to 14, 1922—Annual Meeting of the Society of Automotive Engineers, Engineering Society Bldg.

FOREIGN EVENTS

- Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.
- London, England, October 13 to 23, 1921—Olympic Commercial Car Show.
- London, England, November 4 to 12, 1921—Olympia and White City, Fifteenth International Motor Exhibition. Apply to exhibition manager, Society of Motor Manufacturers and Traders (Ltd.), 83 Pall Mall, London, S. W. 1.

Analysis Shows Basic Betterment of Automotive Conditions

Continued orderly improvement of fundamental financial conditions, despite the customary seasonal slump in sales, is the dominant feature of an official survey of the automotive industry for the months of May and June, just made public by the Motor and Accessory Manufacturers' Association.

A statistical chart maintained by the association, shows that month-to-month purchases of vehicle manufacturers from parts makers, held their own in May, as against April, but declined fifteen per cent in June. In May the total past due accounts showed an encouraging decrease of fifteen per cent but a four per cent increase in June as against May. The third curve—showing the totals of notes outstanding—registered a healthful trend downward in both months, declining sixteen per cent in May and ten per cent in June.

In view of the fact that the car and truck manufacturers' purchases of raw materials, units and equipment are necessarily made several months in advance of vehicle shipments to dealers, this drop in the sales curve merely reflects the normal seasonal condition of the industry.

Since close to four hundred of the principal makers of parts and equipment are affiliated with the Motor and Accessory Manufacturers' Association, and since about three hundred of them report the financial facts and figures used as the basis for the survey, this official picture of present conditions is regarded as impartial and authentic.

One of the significant features of the present trend in automotive circles is the orderliness of the adjustment process. Rigid prudence in purchases, revitalized merchandising machinery, renewed faith in the basic soundness of the automotive industry, and above all a highly encouraging automobile production record for the second quarter of 1921, are salient elements in the industrial diagnosis.

Word is received from the National Automobile Chamber of Commerce that production of car and truck factories in the three months period ending June 30th was eighty-seven per cent of the corresponding period in 1920. The automobile manufacturer with the largest production is operating at one hundred and thirty-six per cent of the 1920 basis, all the others averaging fifty-seven per cent or more than double the rate of the first quarter of the present year.

The percentage figures for the last five months follow:

Month	Total Purchases Per Cent Change	Total Past Due Accounts Per Cent Change	Total Notes Outstanding Per Cent Change
Feb.	66.15 Inc.	17.07 Dec.	39.08 Inc.
March	93.30 Inc.	16.57 Dec.	16.38 Dec.
April	32.93 Inc.	4.49 Dec.	5.94 Inc.
May	00.13 Inc.	15.64 Dec.	16.77 Dec.
June	15.19 Dec.	4.79 Inc.	10.37 Dec.

Chamber of Commerce of the U. S. Favors Repeal of War Excise Stigma Taxes

Referendum 36 of the Chamber of Commerce of the United States has committed that body to a tax program in absolute accord on all essential points with the policy previously adopted by the National Automobile Chamber of Commerce.

By this referendum it reverses its former position on the sale tax. It now stands committed to the repeal of the excess profits tax; the repeal of war excise taxes both on particular businesses and on transportation and communication; and to the advocacy of a sales tax to bring in such revenues lost through repeals as the Government's necessities may require, the particular form of sales tax advocated being the turn-over tax.

It is very gratifying to note that at last the various businesses and industries represented by the Chamber of Commerce of the United States, not only those suffering from discriminatory taxation at the present time, but those that are not, appreciate the injustice of the special discriminatory "stigma" taxes on particular businesses.

The vote on the repeal of the tax on transportation and communication was overwhelming, being 1443 in favor of the repeal with 290 against. The next largest vote was for the repeal of the war excise taxes on particular businesses, including automobiles and accessories.

The United States Chamber of Commerce estimates that the repeal of the excess profits taxes and the excise taxes will diminish the revenue of the Government one billion dollars so that a turn-over sales tax is advocated to make up such portion of this deficiency as is really necessary.

The vote was decisive against increasing the income tax on corporations.

Thus the Chamber of Commerce of the United States is committed to a tax program which is in absolute accord on all essential points with the policy previously adopted by the National Automobile Chamber of Commerce, the only difference being that the referendum resulted in favor of the turn-over sales tax, whereas we favor the retail sales tax, our position being that we favor a sales tax of any sort, but preferably a retail sales tax.

Movie to Aid Salesmen

A novel method of equipping the jobber salesman with a knowledge of the why and wherefore of the product he is selling is being put in operation by the Raybestos Co., of Bridgeport, Conn. A moving picture film entitled "Out of the Rocks," has been made by the Rothacker Film Mfg. Co., of Chicago, Ill., depicting the process of material used in the construction of Raybestos brake lining from the time the asbestos is blasted out of the solid rock until the Silved Edged lining is applied to the brake band.

The picture is in three reels, the first being devoted to the mining of asbestos, the second to the fabrication of Raybestos and the third to relining a brake and a sales demonstration.

Maxim Would Build Roads With Disarmament Savings

A five-year program for the expenditure of funds saved by a general disarmament compiled by Hudson Maxim, for years an advocate of a big army and navy, includes the construction of 25,000 miles of concrete roads. His program, appearing in the July issue of Current Opinion is significant in that the present situation has induced such a radical change in policy of an ardent militarist.

The armament truce for five years will permit a saving of a billion dollars a year. For the first year this sum could be used in constructing "five roads extending east and west from ocean to ocean and six roads extending north and south from Canada to Mexico and the gulf, connecting all the principal cities and towns.

"The roads should be made 20 ft. wide, of the best and most substantial concrete construction with the liberal allowance of \$40,000 a mile or one billion dollars for 25,000 miles.

"Consider for one moment what such a network of roads would mean to the farmers in getting their produce to market. Think of the cheap transportation that would be possible on short hauls by motor truck. What a blessing such a system of concrete roadways would be to the automobilist, and how the automobile industry would be stimulated and benefited.

"As a defensive military measure such a system of concrete roads would be of first importance. Germany's splendid roadways enabled the German armies to move and concentrate upon any front with great rapidity—to meet a Russian advance with overwhelming force on one day and a few days later to mass the same man and equipment at a threatened point on the western front."

Trollibus is New Mode of Travel

Relief seems in sight for the suburbanite doomed to a mile hike in order to reach the street car that is to take him to the office, for now comes the trollibus which promises speedy extension of the nation's street car facilities.

Emerging from the experimental stage this new mode of travel is in general use in at least one large city. In fact, Richmond, Va., has had a number of trollibuses in operation for some time and, according to the Firestone Ship-By-Truck Bureau, the new vehicles are a much less expensive method of transportation than a street car system.

In appearance the new buses are somewhat similar to the one-man street cars used in the smaller cities. They are operated on the pre-payment plan, with mechanical door control. Other working features are the dead man's handle, emergency rear door and powerful railway motor. Except that the car gains its power from overhead trolley lines, it is operated in all respects like a big motor bus. It may be guided in and out of the traffic and brought to a stop at the curb.

Truck Production Shows an Increase

Production reports from the car and truck factories of the country show that the automobile business in the second quarter of 1921 was 87 per cent of the corresponding period in 1920, due largely to the fact that one of the chief manufacturers is operating at 136 per cent of the 1920 basis. The other makers, however, are going on a 57 per cent basis and are manufacturing at 107 per cent, or more than double, the rate of the first quarter this year. **Motor truck production is more than one-third better than it was during the first quarter.**

This return of activity in the third largest industry is expected to be a marked stimulus to other lines. During the second quarter cotton production was at 82 per cent, employment at 75 per cent, zinc at 41 per cent and pig iron at 39 per cent of the same period a year ago. The effect of the large sales of automobiles is expected to be felt in these commodities during the third quarter.

Automobiles not only consume large quantities of raw materials, but also call for production in semi-finished and allied lines such as electric wire, accessories, tires. The industry itself employs over 300,000 men in its factories, with as many again in the accessory plants.

There are 35,000 dealers in the country employing 100,000 salesmen. This army of salesmen has been one of the most potent forces in turning the tide of depression. The "order takers" were quickly eliminated last fall, and the men who remained were experienced sellers of transportation. The good automobile salesman has to be a high type of man, since he must have some engineering knowledge, and he must see to it that the car gets proper attention after it is sold if he is to secure re-orders.

In addition to the thousands of efficient salesmen, the usual spring and summer demand for motor transportation has started the upward turn in the automobile business. With 9,200,000 cars in use the replacement business each spring runs into the hundreds of thousands. Orders from new owners also come in most heavily at this time of year.

Duty Motors to Move to Elgin

The Elgin, Ill., Association of Commerce has accepted a proposition from the Duty Motors Corporation, Greenville, Ill., manufacturer of motor trucks, to remove its plant to the former city. A site has been donated to the corporation and suitable buildings will be erected this fall. It promised to employ two hundred men at the outset and increase this as business conditions warrant. The Duty Motors Corporation was organized eighteen years ago, and the capital stock is \$500,000. W. H. Ruther is president; Paul Harnetaux, vice-president, and W. J. Bubser, secretary-treasurer. The standard truck now manufactured is of two-ton capacity. Necessity for an enlarged plant and better railway facilities forced the removal. It is hoped to have the first building ready by November 10.

Plans Progress for Credit Convention

Further plans for the "Back to Normal" convention of the Motor and Accessory Manufacturers' Association to be held at the Hotel Statler, Detroit, Mich., September 14, 15 and 16, were announced by General Manager M. L. Heminway.

In addition to the major theme of the convention "Bringing the Automotive Industry Back to Normal" the central key-note of most of the papers and discussions will be "Business Conditions in the Automotive Industry and Prospects for the Future." It is planned to have this topic presented and subjected to open-forum discussion: (a)—From the standpoint of the raw material producer. (b)—From the standpoint of the parts manufacturers and unit and equipment makers. (c)—From the standpoint of the vehicle manufacturers. (d)—From the standpoint of selling the automobile to the ultimate consumer market.

Leading executives in the various branches of the industry will be assigned to direct the discussions.

Another feature of the convention which should be particularly stimulating will be a symposium on the subject "Selling Strategy to Bring the Automotive Industry Back to Normal." Speakers in this symposium will be sales and advertising executives of the automotive industry.

Although the convention is primarily a credit concurrence, the attendance will not be confined to credit and financial officials of the constituent companies. In view of the vital problems challenging the interest of the entire industry this year, it is expected that many of the sales and advertising directors and general executives of the affiliated companies will be present.

Clark-Turner Has Fine Plant

Working with the idea in view that only high-grade products can be produced by high-grade machinery and equipment, the Clark-Turner Piston Co., of Los Angeles, Calif., has recently completed an up-to-the-minute factory which affords a floor space of 50,000 square feet, with ample room for further development. The producer of the De Luxe piston ring now has a foundry with electric furnaces, a chemical laboratory with the latest apparatus a machine shop and shipping room which is the last word in modern equipment. Already a substantial increase in production has been realized.

Klaxon Prices Reduced

In line with the downward trend of automobile accessory prices, the Klaxon Co., Newark, N. J., has announced its price reduction on all Klaxon horns. The new prices went into effect June 25th. Push buttons and wires are to be furnished only with the Klaxon 20 hereafter, this extra equipment costing seventy-five cents list with Klaxon models 6, 6-Deck, 6-MC, 5 and a dollar list with models 12L and 12S.

Compared with the old prices the reductions range from 6 to 17 per cent, varying according to the model.

Automobile Causes Railroad Abandonment

An effect of automobile travel on railroad operation is shown in the decision of the interstate commerce commission authorizing the abandonment of two branch lines of the Boston & Maine Railroad in New Hampshire. One, extending from Cherry Mountain to Jefferson in Coos County, a distance of three and one-half miles, was built in 1892 for the accommodation of summer resort travel. The increase in motor car travel has caused a steady diminution in the passenger traffic, and in 1919 and 1920 the company reported that the average number of passengers per train three, with total freight revenues in 1920 amounting to \$88 and total passenger revenues \$319. The other branch line extending from Bethlehem Junction to Profile House, a distance of nine miles, also had to give way to the competition of automobiles, as the report shows that the average number of passengers per train during 1920 was two, with revenues amounting to \$1,713 and operating expenses \$12,940.

N. A. C. C. Continues Safety Campaign

One thousand dollars in cash prizes for grammar school teachers is offered for the best lessons in safety education, by the National Automobile Chamber of Commerce.

Announcement of the \$5000 contest for the grammar school children's safety essay contest to be held this fall brought so many inquiries for material for safety education, that the automobile industry has decided to offer these additional prizes to develop the best methods of teaching safety.

The contest will take place during the fall. Details of the competition are being submitted to leading educational authorities; and notice of the conditions will be sent directly to the schools of the country.

The number of accidents in relation to the cars on the roads has been decreasing, showing that the public is taking care of the traffic problem with increasing efficiency. The automobile industry believes, however, that the grand total of accidents can be made to recede considerably through safety education.

Victor Now Marketing Shims

The Victor Manufacturing & Gasket Co., which for the last few years has specialized entirely upon the production of Victor Copper-Asbestos Gaskets, is now putting on the market a complete line of shims. These will be made of both copper and brass and there will be a type for every motor and engine need.

The Victor Company is also putting on the market a new fibre top cylinder head gasket for Fords. This new gasket is in every way identical with the standard Victor Copper-Asbestos Ford Gasket, No. 101, with the exception that in place of the top layer of copper a special non-absorbent, heat-resisting fibre of great strength is substituted.

Data on American Ignition Used by the Allies

In an announcement made in the May issue of the Commercial Car Journal, primarily for the purpose of acquainting the trade with a change made in the personnel of the Splitdorf Company, several additional statements were made, one of which subsequent information disclosed as incorrect. The mis-statement in effect was that the Splitdorf production was the exclusive American Ignition called for by the allies. This assertion was made in ignorance of the true conditions not by the Splitdorf Co., but by the individual who originally prepared the item. In order to convey the exact production status of the various manufacturers listed for American Ignition by the Quartermaster Department to those who may have read the Splitdorf announcement, we are listing below actual appropriations.

On the initial contract placed for ten thousand Class "B" trucks for use in the Quartermaster Dept., the Eisemann Corp. received 50% of the order, which was the maximum amount that could be placed, under United States military rules, with any one manufacturer, 30% to Splitdorf Co., and 20% to the Ericsson Manufacturing Co.

On the second order for Class "B" trucks, the schedule amounted to twenty-five thousand, of which the Eisemann Corp. received a contract for 17,500, the balance was divided among several other manufacturers.

The Eisemann type G-4 magneto and impulse starter, Model 1, were standardized by the Ordnance Department for trucks, tractors and tanks, with the exception of the 10-ton Holt tractors which used K-W Ignition.

Westinghouse to Make Ford Batteries

"Ford Special" is the latest product of the Westinghouse Union Battery Co., of Swissvale, Pa. Designed to enter the Ford replacement field, which has been estimated at 3000 batteries a day, the Ford Special is built with the habit of care and aim at excellence which mark all Westinghouse productions.

Ford Specials are handled by the regular Westinghouse battery distributors and branch service stations. They are being produced in quantity at the Swissvale plant. A zone system for pricing has been adopted. These range from \$25 in the east to \$27.50 on the Pacific coast.

Bars Use of Name "Overland"

An injunction restraining the Akron-Overland Tire Co., of Akron, from using the name "Overland" in their corporate name has been granted the Willys-Overland Co. in the United States Circuit Court of Appeals, sitting in Philadelphia. The Court held that the use of the word "Overland" by the defendant is calculated to lead the public to believe that the goods, stocks and securities of the defendants are the property of the complainant.

Canadian Equipment Show in February

Announcement comes from Winnipeg that the second annual automotive equipment show staged by the Western Canada Automotive Equipment Association will take place February 6 to 11, 1922, inclusive.

During these dates the annual Bonspiel is held in Winnipeg and attracts thousands of visitors to the city from all parts of Manitoba, Saskatchewan and Alberta.

The Winnipeg show is the only exclusive automotive equipment exhibition staged in Canada and the success met with last year convinced the manufacturers and jobbers of Canada that an early start in 1922 would result in the putting on of a far bigger and better show than even the one held in 1921. The Auditorium of the Board of Trade Building has been secured for the above stated dates.

Prospective exhibitors and those interested can obtain full information by addressing W. L. Williams, Secretary, New Stovel Building, Winnipeg.

Clifton is Honored

In recognition of his 10 years as president of the National Automobile Chamber of Commerce, the members presented to Col. Charles Clifton in his home city, Buffalo, last Wednesday, a painting, "La Palais Rouge, Venice," by Le Sidaner, as a token of appreciation of his leadership in the automobile industry. The presentation at the regular meeting of the directors was made by Alvan Macauley, president of the Packard Motor Car Company. Mr. Macauley spoke of the big part played by Col. Clifton during a progress, unparalleled in industry and of the desire of the membership to commemorate the end of his tenth year in office. He concluded by referring to Col. Clifton as the leader of real co-operative competition in this country. The committee in charge was: Alvan Macauley (Packard), chairman, A. J. Brosseau (Mack), F. C. Chandler (Chandler), Roy D. Chapin (Hudson), George C. Dickson (National), M. L. Pulcher (Federal), H. H. Rice (Cadillac).

Wildman Building at Bay City

A plant to provide for a daily output of 2,500 tires and 5,000 tubes is to be erected by the Wildman Rubber Co. at Bay City, Mich., on the west bank of the Saginaw River. The site, which consists of 63 acres, provides a most advantageous location. The first unit will be 365 x 160 ft., three stories and basement. The firm expects to be in production by fall.

G. M. C. Distributing Bonus

In accordance with its bonus policy, the General Motors Corp. has begun the distribution of 123,884 shares of General Motors stock to 6,577 employees. Such stock is given as a bonus for long service, with a minimum of five years. The system of paying the awards is to hold the stock in trust for the employee for five years.

Award Bids Early Advises Hoover

In a letter to Governors of the various states, Herbert Hoover, Secretary of Commerce, suggests that greater economy and more evenly balanced employment would result from fall instead of spring awards of highway construction bids. Mr. Hoover answered the criticism that we are in a period of falling prices and possibly of railroad rates and that contracts let this fall might be at higher figures than would prove necessary later in the season by suggesting the making of provisional contracts so that any such difference would accrue to the state.

His conclusions were reached after a committee was summoned comprising representatives of the great engineering societies, general contractors, and representatives of the state highway departments.

Hawkeye Truck Co. Increases Its Production

Following a reduction in the price of their trucks and the inauguration of a new management two months ago, the Hawkeye Truck Company, has started to build up and increase its business in a very satisfactory manner, according to an announcement made by officials of the corporation.

New prices for the Hawkeye trucks are below those of 1919. The cuts amount to \$265 to \$645 for the 1½ ton to 3½ ton vehicles.

Prices on Hawkeye trucks are as follows: 1½ tons, \$1850 now, formerly \$2365; 2 ton truck, now, \$2650, formerly \$2915; and 3½ ton truck, now, \$3700, formerly \$4345.

I. H. C. Prices Drop

CHICAGO, ILL.—Prices of International and Titan tractors were recently dropped to a level lower than ever they have been before, the International Harvester Company announces:

Revised list prices are as follows:

Titan 10-20, with friction clutch pulley and angle lugs	\$900
International 8-16, with friction clutch pulley and angle lugs	\$900
International 15-30, with friction clutch pulley and angle lugs	\$1750

These figures represent a reduction of \$100 on the 8-16 and 10-20, and \$200 on the 15-30, and bring the prices of the models below any that have been quoted before, considering that the equipment now included with the Titan formerly was extra.

Big Pennsylvania Road Fund Available

As a result of a recent sale of 5 per cent State road bonds, \$10,619,513 has been placed to the credit of the Commonwealth of Pennsylvania in the Philadelphia National Bank. The remainder of the \$15,000,000 issue will be placed in the hands of the syndicate for the bulk of the bonds for marketing later on.

Kant-Skore Moves to Cincinnati

The Kant-Skore Piston Co., of Buffalo and North Tonawanda, N. Y., has purchased the plant of the D. T. Williams Valve Co., at Cincinnati, and is moving their entire factory equipment and general offices to that city. The new plant will permit greatly increased production.

The company was recently incorporated under the laws of Ohio, with a capitalization of \$200,000. Its officers are: John Eckerle, president; George D. Armstrong, vice-president and general manager; Harry J. Hater, treasurer; Louis L. Sinclair, secretary; L. C. Magee, sales manager, and Louis A. Halstead, branch manager.

The product of the company is a self-adjusting alloy piston, designed to maintain a practically uniform diameter under all conditions of engine temperature. It was the expectation of the company to have the new plant in Cincinnati operating at full capacity by the latter part of July.

Son Succeeds Father in N.C.R. Company

Announcement has just been made of three important changes affecting leading executives of The National Cash Register Company.

John H. Patterson has resigned as President and General Manager of The National Cash Register Company but will continue actively in directing the affairs of the company. As chairman of the Board of Directors, Mr. Patterson will advise the directors and help formulate the policies of the company. His son, Frederick B. Patterson, was elected to succeed him as President, while J. H. Barringer was made General Manager.

John H. Patterson has been President of The National Cash Register Company for 37 years. He is regarded as one of the world's greatest business leaders. The institution he has built in Dayton is regarded as the world's model factory.

Cleveland Gets Tire Convention

The second annual meeting of the National Tire Dealers' Association will be staged at Cleveland, October 18 to 20, 1921. Headquarters are to be maintained at the Winton Hotel, where business sessions will be held during the convention. A tire and accessory show is to be one of the innovations, to be conducted by R. F. Valentine, vice-president of the association. The committee anticipates an attendance of from 500 to 700 delegates.

New Local on Coast

The California Automobile Trade Association, ever endeavoring to extend the doctrine of the trade association throughout its state, has established a new local. Field Secretary W. W. Biddick announces that he has just completed organization of the Ventura County Association at Ventura, Calif.

Personal Items

Harry W. Anderson, well known throughout the trade, has associated himself with the Duesenberg Automobile and Motors Co., Inc., whose factory and executive offices are at Indianapolis, Ind. He takes the position of general sales manager.

George R. Berry, general sales manager, and **Harry T. Gardner**, carriage sales manager, of the Packard Motor Car Co., have resigned. Mr. Berry intends to join Earl Anthony, Packard distributor in California. Mr. Gardner has not announced his future plans.

Robert D. Black, who was formerly assistant sales manager of the Black & Decker Mfg. Co., of Towson Heights, Baltimore, Md., has been appointed manager of the company's Philadelphia branch, 318 N. Broad St. He succeeds W. C. Allen, who has gone to the Cleveland branch office.

George Blair, formerly general manager of the Pennsylvania Rubber Co., of Philadelphia, Pa., is now associated with the Trexler Co., of Philadelphia, manufacturer of Trex accessories.

C. H. Booth, receiver for the Republic Rubber Co., of Youngstown, O., announces that production in that company has been resumed in pneumatic tires, tubes and solid tires. Manufacturing is also resumed in the mechanical goods department.

George T. Briggs has been announced as general sales manager of the Wheeler-Schebler Carburetor Co., of Indianapolis, Ind. He was recently general manager of the Motorcycle and Allied Trades Association.

W. J. Bunn will continue as general purchasing agent of the Republic Motor Truck Co., according to an announcement from Frank E. Smith, first vice-president and general manager.

Klare F. Covert will succeed H. R. Lewis, resigned, as sales manager in charge of the general sales offices of the Harrison Radiator Corp., at Detroit.

Roy Davey, along with his duties as manager of the Detroit branch of the American Bosch Magneto Corp., is now manager of the Manufacturers' Trade Dept., at the company's main office at Springfield, Mass.

P. L. Emerson, former assistant sales manager for the Reo Motor Car Co., Lansing, Mich., will take charge of the Reo distribution on the Pacific Coast.

A. E. Fauts, who for the past two years has been in Europe in the interests of the Garford Motor Truck Co., has returned to New York, where he will confer with officials of the company on European truck markets and the future policies of the company in that field.

M. B. Foster is to be sent by the Klaxon Co., of Newark, N. J., into Northwestern territory to boom Klaxon business there. He will make the rounds of accessory dealers in a number of states in this territory and will also cover several of the Canadian provinces.

Frank X. Gaughen, assistant advertising manager of the Willys Light division of the Electric Auto Light Corp., has been made advertising manager, succeeding L. B. Williams.

E. H. Haertlein, assistant sales manager of the Gemco Manufacturing Co., of Milwaukee, Wis., has been appointed to succeed Mr. Treviranus, resigned as sales manager in that company. D. M. Walls has been placed in charge of the Advertising and Foreign Departments.

Frederic M. Hoblitt has been appointed general manager of sales of the Ajax Rubber Co., Inc., Trenton, N. J., to succeed F. E. Dayton, who has resigned to enter another field of activity.

Edward Hunter has become a member of the sales staff of the General Motors Truck Co. He was for a number of years in the sales department of the McCord Manufacturing Co.

F. E. Kaiser has been appointed manager of the Replacement Division of the Zenith Carburetor Co., of Detroit. His division at present covers over 700 Zenith service stations.

Clarence H. Landsittel, formerly director of purchases for the Templar, has been selected as sales engineer for the Climax Motor Devices of Chagrin Falls, O. The firm is about to put on the market a single cord disk universal.

K. E. MacQueen has been appointed assistant to the general manager of the Bearing Service Co., of Detroit. He was associated with the company at its formation, but for several years was employed at other interests.

Ian E. Maltby, formerly of the Tubular Radiator Corp., and the Bergen Manufacturing Co., both of Chicago, has joined the Milwaukee Auto Engine & Supply Co., of Milwaukee, Wis., as director of sales and advertising.

F. R. Robinson, a veteran of 12 years' service with the Packard, has assumed the duties of secretary and treasurer of the Packard Motor Car Co., of Detroit, Mich. He has held successfully the positions of comptroller, auditor and secretary of the company.

P. L. Russell, formerly manager of service at the Kelly Springfield Truck Co., has become associated with the Chicago Motor Club in the capacity of director of service.

H. M. Salisbury, export manager of the Maxwell Motor Sales Corp., sailed recently for England, France and Holland, where he will spend some time in looking over the field with a view to determining what may be expected from that quarter in the coming year.

Herschel C. Smith, formerly Deputy State Highway Engineer of Oklahoma, has been appointed Assistant Professor of Highway Engineering and Highway Transport at the University of Michigan, from which institution he graduated in 1913. Last October Mr. Smith was elected Roy D. Chapin Fellow in Highway Transport at the University of Michigan and in June received the degree of Master of Science in Highway Engineering and Highway Transport.

A. G. Stevens, chief of the Goodrich Travel and Transport Bureau, Akron, Ohio, has resigned. His future plans are not definitely settled, but it is likely that he will locate in Akron with an organization of his own.

Earl A. Tarbox has severed his connections with the Vellie Co., of Moline, Ill., to become manager of the Moline Oil Co., at Moline, a distributor of high grade lubricating oils of all kinds.

Removals and Trade Changes

The A. H. Peterson Mfg. Co., large tool and die manufacturers, have discontinued this department and will turn over their entire plant to the manufacture of "Hole Shooter" portable electric drills and other automotive devices.

The Chevrolet Motor Co. has moved its general offices from New York to the General Motors Bldg., in Detroit. K. W. Zimmerlied, formerly assistant to President Durant, of the General Motors, is to be the first general manager of the Chevrolet.

The Sorg Motor Car and Truck Co., of Detroit, has leased the entire building, Woodward Ave. and Alexandrine. A sales-room space of 60 x 75 ft. is now afforded.

New Incorporations

The Stokes Manufacturing Co. is to erect a factory at Owosso, Mich., to manufacture manifolds and other automobile parts. The company has a new method of bending metal tubing which will not change the interior diameter of the tube.

The Waltham Motor Manufacturing Co., Inc., has been chartered under Massachusetts laws with a capital of \$3,500,000, represented by 250,000 shares of preferred stock, par \$10, and 200,000 shares of common of \$5 par value.

The Shaw Rubber Co., Jacksonville, Ill., has been organized and has acquired the tire and accessory store of the J. Q. Gill Rubber Co., at 805 Main St., that city.

The International B. F. Goodrich Corp. has been organized and incorporated under New York laws with authorized capital of \$10,000,000, and will represent the B. F. Goodrich Co., in all foreign countries except Canada. B. G. Work is president.

The Utility Battery Company of America has been incorporated at Dover, Del., to manufacture and sell electric and storage batteries. Capitalization is \$5,000,000.

The Automatic Clutch and Transmission Co. has been chartered at Wilmington, Del., to manufacture clutches, power controlling mechanism, etc.

Factory News and Capital Increases

The American Hammered Piston Ring Co. recently shipped a car load of nearly a half million piston rings from Baltimore to the Pacific Coast. This stock, which consisted of five hundred different sizes, will form the stock of the company's western district.

The Temme Spring Corp., Chicago, Ill., has recently signed a contract with American Autoparts Co., Detroit Mich., under which the entire output of replacement springs of the Detroit plant will be handled by the Temme Corp.

The Bassick Manufacturing Co., of Chicago, closed its entire plant during the last two weeks in July for the purpose of giving all their employees a vacation.

The Motor Wheel Corp., Lansing, Mich., has obtained the contract for all wood wheels to be used by the Packard Motor Car Company in both trucks and passenger cars.

The Hinkley Motors Corp., of Detroit, has acquired a 7½-acre site in Ecorse for the purpose of building a new factory. The company manufactures passenger cars, trucks and tractors.

The Curran-Detroit Radiator Co., of Detroit, who manufacture radiators for Ford cars and trucks, report numerous orders for car load lots, with indications of a busy fall and winter.

The Bantam Ball Bearing Co., of Bantam, Conn., has recently added a replacement department to its organization in charge of J. H. Kraus. Arrangements are now being made with dealers throughout the country to carry a stock of various bearing applications for replacement service.

The Lee Tire & Rubber Corp. is working on a 2000 tire a day schedule, which is the largest production record in the history of the company. Demand for tires is said to be running ahead of production.

The United States Rubber Co. passed its quarterly dividend of \$2 a share on common stock and declared the regular quarterly dividend on preferred stock.

New Agencies

The Allied Machinery Company of America, 51 Chambers St., New York City, has been appointed foreign representatives in all countries except the U. S. and Canada for the Universal Crane Co., Cleveland, O. The latter company produces a three to four ton portable gasoline or electric locomotive crane for mounting to suit working conditions.

The George P. Clark Co., Windsor Locks, Conn., manufacturer of factory trucks and casters, has opened a new branch office and warehouse at 205 Vine St., Philadelphia, Pa.

The India Tire & Rubber Co., of Akron, O., has opened in Dallas, Tex., a direct factory warehouse, where all its products will be kept in stock. In charge will be Harry L. Corbett, formerly of the Norwalk Tire & Rubber Co.

Trade Literature

Steam Road Vehicles has just been published in second edition. The volume is a thorough treatise on the underlying elements of the theory and practice in the use of the steam wagon and tractor by L. M. Meyrick-Jones, of England. The writer has been a frequent contributor to the Commercial Car Journal and is particularly well versed on truck transportation.

The F. W. Wakefield Brass Co., of Vermilion, Ohio, has recently published a leaflet

which explains the various "Red Spot" line of spotlights manufactured by them. The feature of the most recent model is the Wakefield "silver lining" or inner shell, silvered and highly polished, which cannot tarnish from seepage, nor easily dent in service.

The Engineering Index, 1920 edition, has been released by the American Society of Mechanical Engineers, 29 West 39th St., New York City. It not only selects and records all important articles that have appeared in the engineering periodicals of the world, but also gives a concise yet adequate description of each article recorded. Price, \$6. Limited supply.

Automotive Engineering is an English reference work dealing with principles, theory, design, manufacture, testing and employment of everything connected with automotive engineering. Mailed to the U. S. for \$4. The Standard Air Press, Ltd., 36 Shaftesbury Ave., Picadilly Circus, London, Eng.

The Greenfield Tap and Die Corp., of Greenfield, Mass., is now distributing a new and comprehensive catalog describing the small tools and pipe tools which comprise the greater part of its products. A copy of this book will be sent on request provided the name of this publication is mentioned.

Hilliard Products and Service is a new pamphlet for dealers, jobbers and garagemen, issued by the Hilliard Clutch & Machinery Co., of Elmira, N. Y., which shows the company's line of replacement flywheels, replacement steel ring gears for flywheels, cylinder grinding and piston facilities. Sent on request.

The 1921 Edition of the Highways Green Book, published by the American Automobile Association, 1108 16th St., N. W., Washington, D. C., is said to be more complete than previous editions. There is a chapter on highway financing which is of great interest. Price, \$2.00 to members and \$3.00 to non-members.

The Link-Belt Co., of Chicago, Indianapolis and Philadelphia, has just issued a new Steel Chain Data Book No. 475. In this book is presented completely the heavier rugged steel chains used for power transmission, also elevating chains. Copies on request.

Sharon Products is a "character study" of the improved plant of the Sharon Pressed Steel Co., of Sharon, Pa., published in attractive pamphlet form. The work is illustrated with a number of fine photographs.

Obituary

Albert Taylor, Manager North Atlantic District, The Electric Storage Battery Co., and well known in the electrical industry, died suddenly on July 6th in New York. In 1898 Mr. Taylor entered the employ of The Electric Storage Battery Co. as a salesman in their New York Office. In January, 1900, he was made Assistant Manager, and in March of the same year was appointed Manager of the New York Office. Mr. Taylor's character won him many friends. His ability to put himself in the position of the other man won for him a merited reputation for square dealing. He enjoyed the utmost confidence of all his customers.

Big Foreign Market is Seen for Trucks

That motor truck business is soon due for a marked impetus abroad, as well as in the United States, is the firm belief of Transport Truck Co., of Mount Pleasant, Mich.

This company has operated steadily through the period of readjustment and has not only developed markets at home, but has made promising connections at foreign points. By arrangement recently concluded, Keegan Aprahamian & Co., of New York, will take care of Transport business for China, Japan, Philippine Islands, Dutch East Indies, French Indo-China, Federated States of Malay, Straits Settlement, Burma, Ceylon, India, Persia, Egypt, Arabia, Siam, Australia, New Zealand, Tasmania and South Africa.

"The motor truck business is due for a steady increase from now on," said F. D. Engle, sales manager of the Transport. "With unmistakable signs of a break of the deadlock in leading lines of industry, the impulse will be felt emphatically in the demand for trucks. Every business depends upon them.

"We have found that intensive salesmanship goes far to overcome apathy. Shrewd heads of business realize that marking time can be only a temporary interruption—and they are getting ready now to move forward. We will have all the business we can handle—at home as well as abroad."

Facsimile of the Inner Side of a Folder Prepared by H. S. Morrison, Auburn, Rhode Island, for the Assistance of Prospects Before Making Investment.

The author of the folder had occasion to employ frequently this guide in his business relations with prospects to mutual advantage. It is a synopsis of the points to check, by those not versed in truck knowledge, in making a scientifically correct selection of a commercial car.

"MOTOR TRUCK BUYER'S GUIDE"

1. Stability of the Manufacturer.

- A. Financial condition.
- B. How long doing business.
- C. Personnel. (Management).

2. Method of Marketing Product.

- A. Factory Branch.
 - a. Personnel. (Management).
 - b. Facilities for giving service.
 - (1) Handling emergency work.
 - (a) Service trucks.
 - (2) Doing overhaul work.
 - (3) Stock of repair parts.
- B. Local dealer.
 - a. Financial condition.
 - b. How long doing business.
 - c. Personnel. (Management).
 - d. Facilities for giving service.
 - (1) Handling emergency work.
 - (a) Service Trucks.
 - (2) Doing overhaul work.
 - (3) Stock of repair parts.

3. The Product.

- A. Quality.
 - a. Materials.
 - b. Workmanship.
 - c. Equipment.
- B. Mechanical Features.
 - a. Facility of part replacement and adjustment.
 - (1) Bushings.
 - (2) Price of parts.
 - (a) Compare price of chassis with total cost of parts.
- C. Adaptability.
 - a. Size.
 - (1) Space taken up.
 - b. Weight.
 - (1) Distribution.
 - (2) With reference to capacity rating.
 - c. Speed.
 - (1) Governed.
 - d. Capacity.
 - (1) Economical range of each model.

4. Price.

- A. Terms.
- B. Resale value. (Depreciation).

"BE SURE OF EVERY POINT AND YOU CAN'T GO WRONG"

WHAT DOES IT COST TO OPERATE A BUS LINE?

Here is an Article Which Every Dealer Should Read Who is Working on a Bus Line Project. The Bus Field Needs Careful Development

FOUR years ago a man prominent in the automotive world remarked: "You and I may not live to see the day, but surely the next generation will, when there shall not be a street car track in any of our large American cities; when motor buses and trackless trolley cars shall supplant street cars almost entirely and when ultimately they will replace them altogether."

And he was ridiculed and laughed at, called an idle dreamer with an elastic imagination.

That same "idle dreamer" of four years ago today modifies his four year old prediction, and unhesitatingly says:

"You and I SHALL live to see the day when the street cars will be almost entirely supplanted by motor buses as passenger-carrying vehicles, and by trackless trolley cars."

But he is not laughed at nor ridiculed today.

His "idle dream" is materializing.

Conditions have changed sharply within the past three or four years in the automotive world and in respect to transportation methods. Truckportation has developed much more rapidly than had been thought even by the less conservative-minded men of the automotive industry. The motor bus has come into its own, not perhaps at this time as a definite competitor of the street car, but in augmenting street car transportation, and in serving as an auxiliary both to urban street car service, and interurban trolley transportation service.

In fact, the day of the trackless street car is believed to be dawning for America.

The motor bus has emerged from the experimental stage and unquestionably has proven its adaptability, and the profitability of its employment, as a passenger-carrying vehicle operating as an auxiliary to urban street car service, according to experts who have made a careful study of the motor bus proposition, and who claim

to have proven their contentions by actual operation of motor bus passenger-carrying systems on a scale sufficiently large to provide an interesting comparison with street car lines.

With the development of the motor truck, the motor bus has come into great prominence as a mode of passenger transportation, but the development has been slow and unorganized, with much groping in the dark in connection with the initiation and operation of the motor bus as a commercial enterprise and even as a public utility. This is attributed largely to the fact that with but a very few exceptions, the motor buses in operation today were started by more or less irresponsible parties because of their lack of knowledge of what factors effect success in a business enterprise, rather than because of their foresight and business vision. The result of such a hit-and-miss method of development, no doubt, has greatly retarded the introduction of the motor bus into its proper place in the passenger transportation system, while the lack of reliable data on motor bus operation has retarded the entry of responsible business men into motor bus passenger-carrying ventures.

Room for More Bus Lines

Up until the present time there has been but one extensive urban bus system in vogue which could afford a comprehensive idea of the practicability of such service and this bus line has been developed under special conditions which probably do not exist anywhere else in America. For that reason the statistics are regarded as containing little of value in forecasting the probable result of motor bus operation in the thousands of urban centers in the United States which now are badly in need of motor bus service to augment inadequate street car service.

Reference is made to the Fifth Avenue bus line in New York City.

To gather reliable data and to make an accurate forecast, it is admitted that the

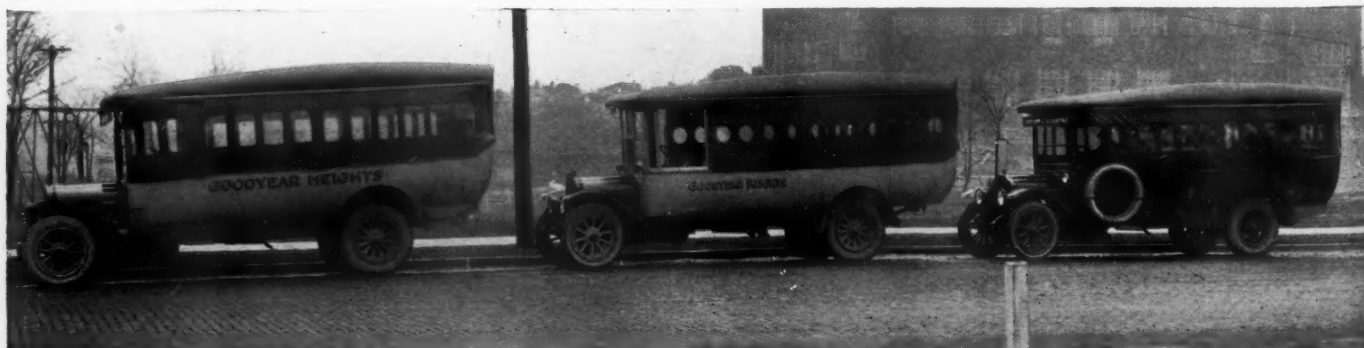
figures upon which to base predictions and upon which to also base new business ventures, must come from bus lines which do not operate parallel to street car lines such as the New York bus routes.

Statistics on original equipment cost, cost of operation and maintenance, and net profit and profit per passenger carried, just announced relative to perhaps the largest regular motor bus passenger urban system in America outside of the Fifth Avenue bus lines, therefore, are of especial interest to the automotive world and to transportation engineers.

The bus system referred to is that maintained in Goodyear Heights, a new residential development in Akron, Ohio, where motor buses, service as an auxiliary to Akron's present woefully inadequate street car service, serve a population of more than ten thousand, and operate over 18 miles of paved streets, maintaining schedules as regular and punctual as those of the city car lines, and carrying an average of more than a million passengers a year. The figures cover a period of 37 months during which over 4,500,000 passengers were carried.

Unlike the Fifth Avenue buses, the Goodyear Heights buses have not been operated as actual competitors to street cars, but more as auxiliaries thereto, the bus lines operating tangent to but not parallel with any street car line in the city. All buses are of the pay-enter type, seating from 30 to 50 passengers each and have operated on three and seven-minute schedules and on a straight five cent cash fare basis.

For the entire 37 month period covered in the tabulation of operating costs, etc., the buses carried over 4,500,000 passengers at an average net profit per passenger of .0052 cents, or a total net profit of \$23,991.10. During the peak operation of the rubber industry, when Akron was known as the fastest growing city in America, and when nearly 100,000 workers were



The Bus System Employing These Buses is a New Residential Development in Akron, Ohio, and is an Auxiliary to Inadequate Street Car Service

	Dec. 1, 1917, to Dec. 31, 1918 (13 months)		Calendar year, 1919		Calendar year, 1920		Dec. 1, 1917, to Dec. 31, 1920 (37 months)	
	Per Cent	TOTAL	Per Cent	TOTAL	Per Cent	TOTAL	Per Cent	TOTAL
Investment								
Investment in buses beginning of period.....								
Investment in buses added during year.....		\$ 6075.00		\$ 8335.75		\$ 29369.65		\$ 6075.00
TOTAL INVESTMENT.....		\$12499.98		\$39105.81		\$76937.79		\$90838.18
Operating Expenses and Fixed Charges								
Revenue from buses sold or disposed of.....		4164.23		9736.16		\$ 8572.26		\$ 8572.26
Depreciation charged to operating expenses.....		\$8335.75		\$29369.65		18720.41		32620.80
Depreciated investment in buses, close of year.....						\$49645.12		\$49545.12
Operating Expenses and Fixed Charges								
Gasoline.....	13	\$ 2569.89	14	\$9745.45	13	\$16299.00	13	\$ 28514.34
Lubricating.....	3	561.91	4	3036.32	2	3080.25	3	6678.48
Tires (Consumer list prices).....	16	3168.04	18	12819.89	14	16972.14	15	32960.07
Drivers' wages.....	22	4202.62	22	15558.68	27	33072.45	25	53733.75
SUB TOTAL GROUP No. 1.....	54	\$10502.46	58	\$41160.34	56	\$70223.84	56	\$121886.64
Maintenance, Materials, and Labor.....	12	\$2402.34	14	\$10230.35	12	\$14453.86	13	\$27086.55
Sunday expense, including direct and indirect supervision, minor adjustments, washing, etc., non-productive store expenses and administrative overhead.....	6	1221.57	7	5226.78	8	9386.01	8	15834.36
Miscellaneous expense.....	1	195.12	1	291.61	1	788.48	1	1275.21
SUB TOTAL.....	19	\$3819.03	22	\$15748.74	21	\$24628.35	22	\$44196.12
Insurance (passenger and public liability).....	2	\$ 437.50	3	\$ 1812.50	4	\$ 4363.26	3	\$ 6613.26
Garage rent at \$10.00 per bus per month.....	1	140.00	1	580.00	1	1394.32	1	2114.32
License, tags and 6% interest on investment.....	3	506.18	2	1735.03	3	4192.75	3	6433.96
Depreciation on bus equipment.....	21	4164.23	14	9736.16	15	18720.41	15	32620.80
SUB TOTAL.....	27	\$5247.91	20	\$13863.69	23	\$28670.74	22	\$47782.34
Total all operating and fixed charges.....	100	\$19569.40	100	\$70772.77	100	\$123522.93	100	\$213865.10
Revenue 5c cash fare.....	133	26043.95	123	87259.45	101	124542.80	111	237846.20
Net profit on above basis.....	33	6473.55	23	16486.68	8	1019.87	11	23991.10
Profit per passenger carried.....		.0124		.0094		.0004		.0052
Cost per passenger carried.....		.0376		.0406		.0476		.0448
Net profit in per cent per year of average investment.....		89%		87%		2.6%		36.5%

engaged in the rubber industry, and when passenger travel was much heavier, the Goodyear Heights buses showed a profit per passenger of .0124 cents. But with a sharp decline in the rubber industry and the exodus of many families from Goodyear Heights, passenger traffic decreased sharply, and due to the fact that buses were not carrying capacity loads on half their trips, the profit per passenger fell to .0094 cents and then to .0004, making a mean average for the 37 month period both of the high tide of business and low ebb of business, of .0052 cents per passenger.

The figures show a net profit in per cent per year of average investment of 36.5 per cent. In 1918 due to heavy travel, this per cent of profit was 89 per cent, and 87 per cent in 1919, dropping to 2.6 per cent in 1920, during the rubber industry slump. The bus line was started with an original investment of \$6075. The total investment for the three years, including original equipment and new equipment added, was \$90,838. Revenue from buses sold amounted to \$8572. Depreciation charged to operate expenses was \$32,620 and depreciated investment in buses at the end of the period was estimated at \$49,645. The total of all fixed and operating charges during the period was \$213,865 as compared to a total revenue from a five-cent cash fare of \$237,846.

Operating and Fixed Charges

The operating and fixed charges for the 37 month period ending Dec. 31, 1920, show gasoline cost a total of \$28,514.34 or 4.75 cents per bus mile; lubricating \$6678.48 or 1.15 cents per bus mile; tires \$32,960.07 or 5.6 cents per bus mile; drivers' wages \$53,733.75 or 9.14 cents per bus mile, for a total of \$121,886.64. Maintenance including materials and labor amounted to \$27,086.55 or 4.60 cents per bus mile, and miscellaneous and sundry expenses including the cleaning and washing of buses, and administrative overhead, aggregated \$17,109.57 or 2.90 cents per bus mile.

Insurance carried including public and passenger liability amounted to \$6613.26 while garage rent at \$10 per bus per month totaled \$2114.32. License tags and six per cent interest on investment totaled \$6433.96.

The per cent of available time that the bus equipment was operated in 1918 was 91.5 per cent, as compared to 65 per cent in 1919 and 46 per cent in 1920. These figures are significant in that they show net earnings of property to be almost directly proportional to the load factor.

Show This to the Real Estate Man

Entirely separate from the marginal profit obtained in operation of the Goodyear Heights bus system, is a factor of utmost importance to any growing city. Even had the buses been operated at a loss rather than a substantial profit, the system would have paid as an investment leading towards a great Akron. Akron grew from a population of 69,000 in 1910 to 208,435 in 1920. Most of this growth occurred during the last six years, when the street railways were experiencing a constantly diminishing net income. New

capital for necessary extensions could not be obtained, and development of new residential sections to keep pace with Akron's rapidly increasing population, was seriously handicapped. With the development of Goodyear Heights its citizens had to forego the convenience of electric traction service. Many men seeking homes, refused to buy property in Goodyear Heights, choosing to help congest the more thickly populated sections of the city by encouraging conversion of alleyways into courts for little clusters of homes.

Something had to be done to help push the new population out to the sparse new residential districts. Bus lines were established, connecting with the street car lines.

History teaches that civilization follows the lanes of transportation. Goodyear Heights was no exception to the rule. With the establishment of bus service the demand for property and dwellings increased rapidly. Property value multiplied. Farm lands beyond the restricted residential section of Goodyear Heights, but within reach of the bus service, were subdivided into building lots, and sold rapidly. Soon the Heights had 1200 homes built and many more in construction, with the demand for building property far in excess of the supply, Goodyear Heights developing faster than any other section of the city.

M. D. Scott, who has been in charge of the Goodyear Heights motor bus system, predicts a great future for the motor bus as a passenger-carrying vehicle to aug-

ment and eventually to supplant urban street car service.

"In Akron the bus lines is not in any sense, as yet, a competitor of the street railway, for which reason it is believed the accurate operating data will prove of real interest to the street railway, real estate associations, chambers of commerce, and to municipal offices and others interested in the solution of passenger transportation problems of American cities," says Scott.

"But this must be borne in mind: The day is passed when the development of this ever-increasing means of passenger transportation can be left to unorganized and irresponsible operators. A more solid type of business man with the necessary financial backing must become interested in the business if its progress is to be rapid and along sound economic lines. The operating characteristics of motor bus lines will be found to be identical with those of street railway lines. The business of passenger transportation can only be looked upon as a necessary public utility and as such it is entitled to and must necessarily receive certain legal protection of earning power, for which it in turn must be satisfied with a reasonable margin of profit. The fact that some state rate commissions have ruled certain restrictions on motor buses and motor truck routes and rates, indicates the tendency of the times to class such operation with that of other public utilities.

Street railway track extensions are estimated to cost from \$45,000 to \$60,000 a

mile, including laying of track, street improvement, and installation of trolley wires. A five-mile extension would, therefore, cost perhaps \$300,000. Purchase of three or four buses in lieu of the permanent extensions would not exceed \$40,000. Thus the comparison between original equipment is striking.

The type of equipment best suited on the Goodyear Heights system has been found to consist of a two-ton chassis equipped with a five-ton engine and an enclosed type of Avery body with longitudinal seats, all mounted on pneumatic tires, with 40 in. x 8 in. tires on the rear and 37 in. x 5 in. tires in front. The five-ton engine is used because it has advantages in obtaining a rapid start after each stop. With this power unit the buses are capable of from 30 to 35 miles per hour where traffic conditions permit of operating at this speed.

Summarizing the results of 37 months' motor bus operation in Goodyear Heights, the only answer that can be given to the question "Can the motor bus solve American cities' urban transportation problems" is "Yes!" emphatically.

On the Goodyear Heights bus runs, now is being regularly used the first multiple wheel passenger bus ever operated in America. Equipped with a Peter Witt type of street car body with pay-enter arrangement, upholstered seats, adjustable windows and electric lights, the six-wheel bus seats 55 people and will accommodate 100 including standing room.

New Freight System Serves Pittsburgh

WITHIN the limits of a circle having Pittsburgh as a center and a radius of 100 miles, are located a large number of very important commercial centers. The freight of these short hauls has long ago outgrown the ability of railroads to handle.

Encouraged by the Pittsburgh Board of Trade and the local banking institutions, the Rainbow Lines, Inc., was organized with a capital stock of \$450,000. A central freight terminal was located in Pittsburgh together with a body building plant and terminal plants in various cities. For instance, an excellent warehouse and terminal plant was erected in Connellsville—a two-story structure with 40,000 feet of floor space.

All kinds of freight is now handled on one-day schedule, the rates averaging from 50 cents to one dollar per hundred pounds.

Selden trucks of 3½ ton capacity have been adopted as standard equipment. It is expected that thirty trucks will soon be in operation, being purchased in fleets of five.

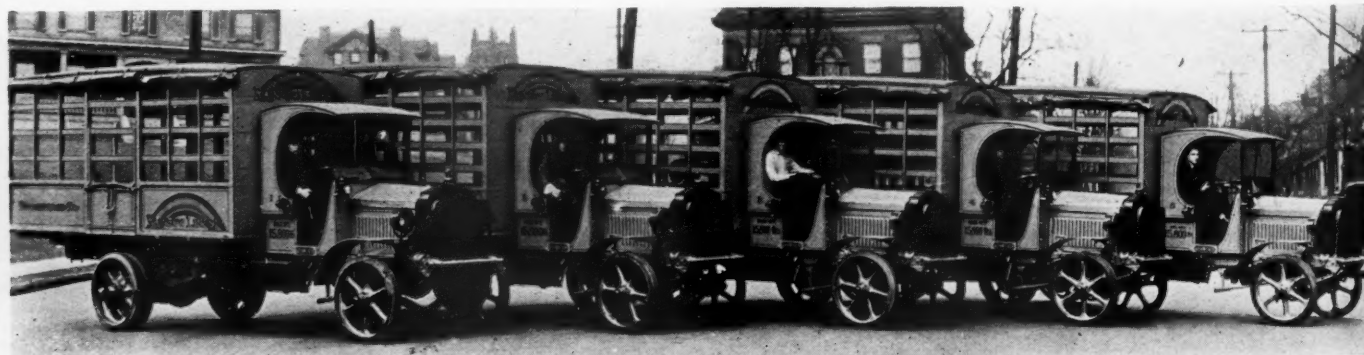
So far it has been found that these trucks operating with an average load of 6000 pounds on all trips, are costing approximately \$25 per day, including all items of Fixed and Variable Charges and Drivers' Wages. All trucks have been averaging from 70 to 100 miles daily.

The Rainbow Lines, Inc., gives the advantages of daily express service, one-day delivery between all points, no lost ship-

ments, no damaged goods, no claims to file, all freight in transit secured, in fact all the advantages of the very speediest service with the common disadvantages of shipping eliminated.

One item assuring the continued success of the Rainbow Lines, Inc., is the executive management and the divisional directors back of it. Men long experienced in transportation, the handling of motor trucks, freight shipping and handling, warehousing, financing and business methods are arrayed in active service.

Motor trucks Highway Transportation lines such as the Rainbow Lines, Inc., are having a great effect upon the commerce of our country. "Ship by Truck on Short Hauls" is a benefit to everyone.



A Few of the Three and a Half Ton Selden Trucks, Which Have Been Adopted as Standard Equipment, by the Rainbow Lines, of Pittsburgh, Pennsylvania

NEW COMMERCIAL CARS



Ruggles New One-Ton Business Truck

FRANK W. RUGGLES, founder of the Ruggles Motor Truck Co., Saginaw, Mich., announces his newest truck success; a truck that combines speed with all the other prerequisites of value, such as safety, power, durability, etc. Maximum strength has been obtained by the use of quality materials and the

able ventilating, rainvision windshield. Color: chassis, radiator, hood fenders, running-boards and springs are heavily enameled in black; seat, body and wheels finished in Ruggles Grey, with blue striping. Tires are 34 x 5 ribbed tread cord on front; 34 x 5 non-skid on rear; Firestone, Goodyear or United States.

The Continental engine used is a Model "N," 4 cylinders, cast enbloc, detachable L-head type. It develops 35 hp. at 1850 r.p.m. The 3-point suspension mounting is substantially built for continuous business service. Battery generator system of ignition with manual advance; ignition generator furnishes current to storage battery for electric lights and electric starting device. The engine is cooled by the Thermo-Syphon system of water circulation through the cylinder jackets and through the cellular core radiator, with radiation assisted by a belt-driven fan. The engine is lubricated by a force feed system through a plunger oil pump to the main bearings and timing gears; the cylinders being supplied with lubricant by the constant level splash system. Fuel is supplied through a Stromberg carburetor of the flat feed automatic type, the fuel vapor being further broken up by a super-heated air device or stove on the exhaust pipe. Air adjustment on dash. Throttle control on steering column and on foot accelerator.

In connection with the engine is a 13-in. multiple-dry-disk clutch completely enclosed in a bell housing. Transmission is in unit with the engine and provides three speeds forward and one reverse. Center control operating in a ball-and-

socket joint. Pall bearings throughout. The gear ratio is 17.55 to 1 in low speed; 9.94 to 1 in second; 5.55 to 1 in high, and 20.47 to 1 in reverse.

The drive shaft extends through two enclosed universal joints and the tubular propeller shaft. Rear-axle is $\frac{3}{4}$ floating with roller bearings. One-piece pressed



Rear End View of the Ruggles Business Truck

proportioning of parts to give the correct construction balance. The 56-inch tread has been adopted as most satisfactory for all round town and country use. Furnished with pneumatic cord tires, it is claimed to take the roads as they come, at express speed.

The units contained in the Ruggles truck have been carefully selected and represent standard makes in the automotive field. They include: Continental engine, Stromberg carburetor, battery generator system of ignition, starting and lighting, one-piece cast steel radiator with cellular core, multiple dry disk clutch, Fuller sliding gears, Columbia $\frac{3}{4}$ floating rear axle, specially designed pressed steel frame, semi-elliptic springs, artillery type wheels, Jacox worm and split nut type steering gear, and Alemite lubricating system throughout.

This truck is sold complete with express body, with canopy top, adjust-



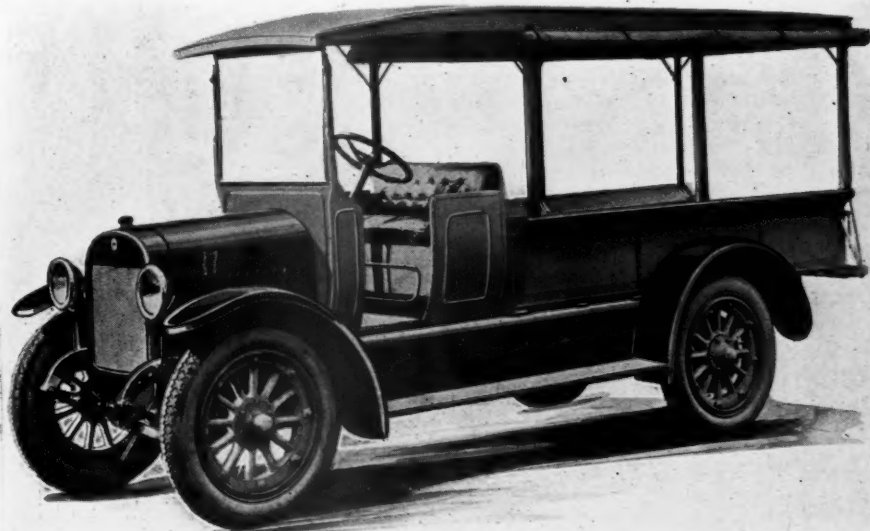
Front View, Showing Light Speed Construction

steel housing electrically welded, giving strength and rigidity.

Front axle is drop-forged I-beam construction with integral yokes and nickel steel spindles with taper roller bearings. The frame is of pressed steel, channel section, length over all, 184 inches; width, 34 inches; strongly reinforced with cross

braces and gusset plates. Frame is suspended on semi-elliptic springs of quality chrome vanadium spring steel consisting of 7 leaves in front and 10 leaves in rear. All shackles provided with Alemite lubricators.

The Jacox steering gear is irreversible and adjustable. Left-hand drive, Large 18 inch steering wheel. Throttle, spark lever and horn button on steering wheel. Two sets of brakes on rear wheels; internal expanding emergency brakes and external contracting service



Completely Equipped One-Ton Ruggles Truck for Jobs in the Light-Duty Hauling Field Where Speed is Required

brakes. Easily adjusted and non-rattling. Wheel are of the artillery type, 12 spokes, demountable rims, taper roller bearings. Wheelbase, 124 inches; tread, 56 inches.

Gasoline tank, tool compartment* and battery under driver's seat. Alemite lubricating system throughout by which

grease can be forced to all bearings and joints at a pressure of nearly 500 pounds.

Standard equipment consists of storage battery, two-unit electric starting and lighting system, head lights with dimmer, ammeter, ignition and lighting switch located on dash, electric horn, extra rim,

tire carrier, complete set of tools, including tire pump and jack.

The driver's comfort is not overlooked in the Ruggles Business Truck, for they have built a seat that is comfortable and roomy. Extra heavy leather upholstery. Ample leg and arm room.

Another Size Denby Truck

THE latest addition to the line of the Denby Motor Truck Co., Detroit, Mich., is a $\frac{3}{4}$ to 1 ton capacity speedster, known as Model 31. This new truck which is the result of exhaustive tests and research is of sturdy appearance and in it is said to have been incorporated a large margin of safety. It is stated to attain a road speed of 35 m.p.h.

Even the frame had received thorough consideration in the designing of the job. It was finally decided to use a $4\frac{1}{2}$ in. depth, pressed steel frame, strongly braced with cross members and gusset plates.

In order to secure engine reliability and performance, a $3\frac{1}{2}$ x 5 in. engine was settled upon. It is of the cast-in-block, removable-head, overhead-valve type. The valves are completely enclosed and operate in a continual bath of oil. Construction of the breather is said to be such as to minimize the amount of dust taken in by the engine. Lubrication is positive forced feed. The extra large crankshaft rotates in three strong bearings. This engine is stated to develop 34 hp. at 1600 r.p.m.

Gas is fed to the engine through a 1 in. carburetor. By employment of a hot-spot manifold greater economy and ease of starting is said to be secured. Ignition is accomplished by a high-tension, water-proof magneto.

Cooling fluid is circulated, by the Thermo Siphon system, through ample-sized water jackets. The radiator is of the built-up type, the top and button tanks of which are cast. Cooling is further assisted by a 16 in. fan.

The clutch and transmission are in unit with the engine. From the engine the power is transmitted through a multiple-disk, dry-plate clutch enclosed against dirt to a selective transmission providing three speeds forward and one reverse. From the transmission the power is carried back to the rear axle through a one-piece, tubular shaft $1\frac{1}{2}$ in. in diam.

Final drive is internal gear with a ratio of 5 to 1. The load is carried on a solid steel bar. Two sets of brakes are provided on the rear axle; namely, service, which is external contracting, and emergency, which is internal expanding. The front axle is of the conventional I-beam design, drop forging.

The frame is suspended on four semi-elliptic springs, 44 x $2\frac{1}{4}$ in. front, and 48 x $2\frac{1}{2}$ in. rear. The heavy-duty wood artil-

lery wheels are equipped with 35 x 5 cord pneumatics, both front and rear.

Controls consist of and are arranged as follows: Steering on left, gear shift and hand brake lever in center, foot accelerator for carburetor, spark and throttle control on steering gear.

The electric equipment also includes self-starter, electric lighting and electric horn.

The price is \$1625 f. o. b. Detroit.

Rock Hand Hoist

THE Rock hand hoist distributed by the Waterloo Body Corp., Waterloo, N. Y., is stated not only to fit any truck chassis but will efficiently handle all loads up to and including $3\frac{1}{2}$ tons. For attaching, the chassis need not be changed in any way. The hoist can be bolted directly to the flange of the frame side members, or can be installed by clips which eliminate the need of drilling. Attachment to the body is made by four bolts through the body cross-sills, so that in lifting the load, no strain is imposed on the front end of the body.

It is pointed out by the makers, that this hoist is easy to operate because needless friction has been eliminated and that every ounce of energy applied at the handle is used in lifting the load.

The hoist had been so designed that no rollers, guides or springs are required to control the position of the mast or swinging frame as this member is held in position by the

direction of the pull of the cables. The quality grade crucible steel cable used is wound on a drum provided with spiral grooves. This feature is said to insure uniform action, since the cable cannot but wind up in a uniform layer.

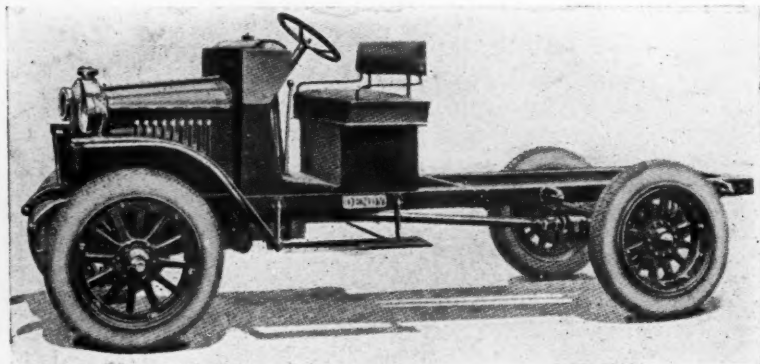
Standard rolled channels are used for the frame side members, which bear the weight of the load when hoisting. All of the weight carrying members, which are used are constructed of rolled steel and malleable iron.

The method of lubrication employed is claimed not only to insure free and easy operation of all moving parts but also to reduce the amount of effort necessary in dumping. The bearings are all provided with recesses or pockets which are packed with grease when the hoist is assembled.

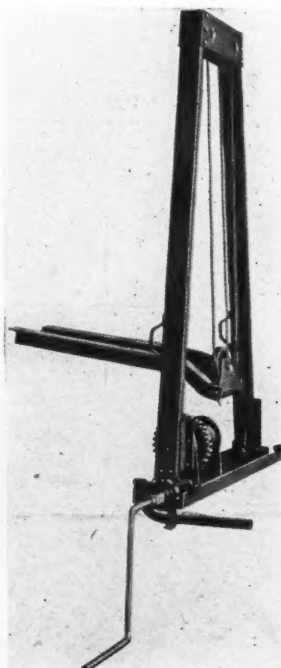
The body can be retained in any position by a ratchet arrangement, and a brake is provided to permit the lowering of the body quickly and without effort after the load is discharged.

The total space between the front end of the body and the cab, occupied by the hoist is 9 in. The total height of the hoist is 66 in., and the weight, complete, of the hoist is 250 lb.

The price of the Rock hand hoist complete with hinges for body chassis is \$100.



New Three-Quarter to One-Ton Denby Speedster



Rock Hand Hoist

Easton Scoop Body for Ford Truck

THE Easton scoop body, manufactured by the Easton Car & Construction Co., New York City, and designed for use by road builders, quarries, coal yards, industrial plants, sand, gravel and clay pits, etc., is a simple

by smooth rolled and welded steel flanges circling the perimeter of the top; the bottom is also heavily reinforced by angles. The sub-frame consists of channels securely framed together, and there is sufficient space between it and the



Standard One-Yard Easton Scoop Body Mounted on a Ford Chassis

all-steel self-dumping body, especially designed for Ford trucks. It is furnished as a complete unit and can be attached or detached by four U-bolts in ten minutes.

The dumping and righting is accomplished by the driver at the seat. This body dumps itself when the latch is lifted, rights easily, and locks itself automatically. One of the features is the depressed lip of the scoop, which permits of easy hand loading, as it affords a very low hand-loading height, which makes it adaptable to many uses, besides those involving overhead bin loading.

The dumping angle is said to be of a degree ample to insure a clean discharge. The dumping angle, however, is adjustable to suit any special requirement by shortening or lengthening two check chains. These check chains are provided with a spring of sufficient tension to cushion the final shock of the dump, thus preventing damage to the body or chassis.

The $\frac{1}{8}$ -in. steel plate body is reinforced



Illustration of the Standard Single Body Unit Complete

driver's seat on the chassis for an auxiliary body or box. The capacities of these single units, which are constructed in seven sizes, range from $\frac{1}{2}$ -cu. yd. to 2 cu. yd.; and the prices range from \$125 to \$185, f.o.b. Easton, Pa., respectively.

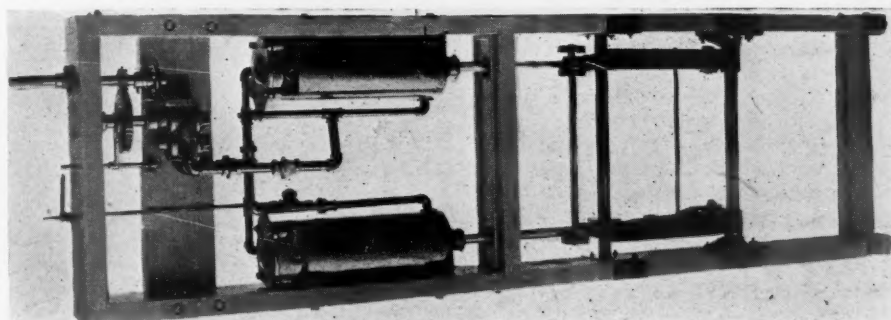
Jumbo Horizontal Hydraulic Hoist

FEW working parts and simplicity of construction, which makes for ease in operation and ready accessibility to both hoist and chassis parts, such as transmission and brake rods, are features that have been given particular stress in the designing of the Jumbo horizontal hydraulic hoist offered by the Jumbo Hydraulic Hoist Co., Chicago, Ill. It can be installed on any make of truck chassis and is produced in two capacities, a light duty hoist having a lifting capacity up to 5 tons and a heavy duty hoist rated at 10 tons. The prices are \$350 and 375, respectively, f. o. b. factory, Chicago.

A constructional feature of this job is its extra heavy sub-frame, which is claimed to prevent any undue strain on the truck chassis when hoisting and afford an equal distribution of weight. The entire construction is free of projecting parts, which materially reduces the possibilities of damage, and the maximum load

lifting stress is carried over the strongest part of the chassis. As a body with low sides can be used in connection with this hoist, easy hand loading is made possible.

Hoisting power is secured through a direct gear-driven pump, provided with a universal slip joint, and double cylinders.



Showing the Finished Assembly of the Jumbo Horizontal Hydraulic Hoist in Sub-Frame

A lever at the driver's seat completely controls all stages of dumping and an automatic stop is provided to stop the hoist when it reaches the extreme height of its travel. The actual mechanical operation of the hoist is conventional involving oil, a gear pump which creates the pressure and suction, etc. The gear pump is driven from the truck transmission by a sliding gear or a power take-off.

The main safety feature is a release valve, which is not connected in any way with the pump, and when closed prevents the body from falling or coming down at any time unless it is released by the operator.

The maker also points out that there is no possible chance of the pistons binding when one rear wheel is lower than the other, or when dumping an uneven load. This evil has been eliminated by a special provision in which the cylinders are fastened to an extra heavy sub-frame. Sagging is entirely prevented.

Master Engine Stand

The Master engine stand put out by the Reschke Machine Works Co., Wichita, Kans., facilitates repair work, in that access to all parts is afforded by any one of three easily obtainable positions.

The construction is such that no matter at what position the stand is adjusted a firm counterbalanced effect is secured by a tension spring.

All position changes of the stand are executed by a release lever operated by the foot of the operator.

The heads of the stand are built so that they are interchangeable. Changes are accomplished by loosening two set screws. In this manner the stand can be prepared for Ford or Fordson work in a moment's time.

U. S. Rubber Adds Colt Plant

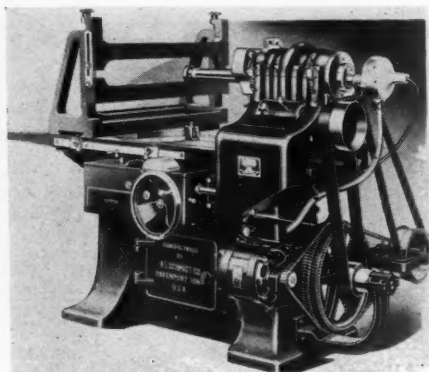
J. N. Gunn, vice-president of the United States Rubber Co., and president of the United States Tire Co., has announced that the Providence Rubber Co. has been organized to take over tire manufacturing operations at Providence, heretofore conducted under the name of the Revere Rubber Co., Colt Plant, Providence, R. I. The Revere Rubber Co. will continue to operate its large mechanical plant, located near the Colt Plant, as heretofore.

Service Station and Repair Shop Appliances

Micro Internal Grinder

The Micro Internal Grinder, manufactured by the B. L. Schmidt Co., Davenport, Iowa, is adaptable for either wet or dry grinding. It is automatic in action both as to feed of cut and table travel. The water travels through the spindle itself directly onto the emery wheel. The amount of water flowing is sufficient to keep the wheel free, and flush cast iron dust. As the water flows out of the hole it travels back to a settling basin in the base of the machine.

In general the Micro is designed for the exclusive purpose of internal cylinder grinding. It weighs about 4000 lb. The



Micro Internal Grinder Made by the B. L. Schmidt Co., Davenport, Iowa
As shown here it is motor-driven

base is of the pyramidal type. A door in the front of the base gives access to the water tank and gear pump. The end of the base supports the driveshaft, which is mounted on a one-piece bearing. The heavily ribbed bed is bolted to the base. The ways are wide one being flat and the other deep V groove, scraped and fitted to the table. It has a center rack drive, and slides back and forth on the bed automatically reversing itself by stop blocks mounted on the side. The table range of speeds is from 11 to 2½ in. per min.

The cylinder jig fixture can be adjusted at various angles. Cylinder blocks are clamped on the inside of adjustable bars, and adjustments are made with the screws mounted on top of the angle plates. The angle has a travel of 14 in. on the screw. A slot in the angle is provided for quick changes from one extreme to the other, having a range of 34 in. The head stock is mounted on the bed, the table traveling under it. Construction of the main bearing is such that it has a spindle within itself. This is machined 9/16 in. eccentric, which with 9/16 in. eccentric in the spindle gives a complete eccentric throw of 1½ in. from dead center. The main bearing is driven from a spur gear, which in turn engages with a chain of gears in the head stock gear box.

The rotary action of the main bearing is controlled by a clutch, which allows the bearing to be stopped in any position. For the automatic feed there are two push buttons, one for increasing and the other for decreasing the feed in units of .0001 in.

This highly developed mechanism permits the operator to accomplish the finest of work without stopping the eccentric action to adjust the cut. The Micro grinds cylinder bores from 2 1/16 to 10 in. diam. and the regular spindle grinds holes 13 in. long. There is, however, a spindle for grinding holes 19 in. long which is furnished as an extra. The wheel spindle fits standard grinding wheels of 1 in. and ¾ in. face, while the range of wheels is from 2 to 6 in. Spindle speeds are 5500 r.p.m. on high, and 3652 r.p.m. on low. Speed of the main driveshaft is 265 r.p.m. When equipped for belt drive a tight and loose pulley is used on main driveshaft.

Weaver Auto Hoist

The Weaver Manufacturing Co., Springfield, Ill., in offering to the trade its auto hoist claims to have produced an item of shop equipment from which can be secured maximum efficiency in lifting trucks or other burdens in or outside of a repair shop. Is employed with equal facility at either the front or rear end of a truck.

Although the impression upon casual glance is great bulk it actually occupies but small area. When in position over a truck it requires only from 12 to 16 in. of space on either side of the truck, and when not in use it can be run astride of some truck in the shop and thus occupy practically no more space in the shop than the truck itself.

By an ingenious arrangement in conjunction with telescoping frame it is possible to elevate the arch of the frame from a minimum height of 7 ft. 6 in. to a maximum height of 9 ft. 2 in. by means of its own power.



Showing Manner in Which the Front End of a Heavy-Duty Truck is Suspended From a Weaver Auto Hoist

The hoisting mechanism is of the worm-drive type; it also acts as a safety device in that it will prevent the hoist from being accidentally released. This construction is also said to permit the burden to be raised or lowered to a fraction of an inch. The wide base, which measures 44 in. from caster to caster provides a safe and substantial foundation. Safety was one of the considerations given serious attention in the construction of this hoist.

Another feature is single suspension. One chain of this hoist may be carried over the pulley in the center of the frame for performing the work which can be handled to better advantage by a single suspension.

Heavy 5 in. channel steel with the arch reinforced on either side by heavy steel plates ¾ x 4 in. make up the main stays of this hoist. The lifting chains are heavy and of tested strength. The roller bearing casters are 5 in. in diam. Lifting leverage, 200 to 1. Width of frames, 6 ft. 4 in. Recommended capacity with double chain is 3000 lb., with single suspension 2000 lb., shipping weight 555 lb.

Wire Brush Cleaner

A new product recently placed on the market by the Ingersoll-Rand Co., 11 Broadway, N. Y., is a wire brush cleaner of rugged design for use with the company's No. 6 "Little David" drill, which was described in the November, 1920 issue, of the Commercial Car Journal, page 60.

The brush has a face diameter of 5 in. and is composed of wires prepared from a special heat treated steel, claimed to contain qualities tending to reduce wear.

Detroit Combination Hand Press

The Detroit combination press offered by the Detroit Garage Equipment Co., Detroit, Mich., is a well-built and powerful hand press. The frame is of heavy steel and the cross brace, as may be seen from the illustration, is welded to the frame.



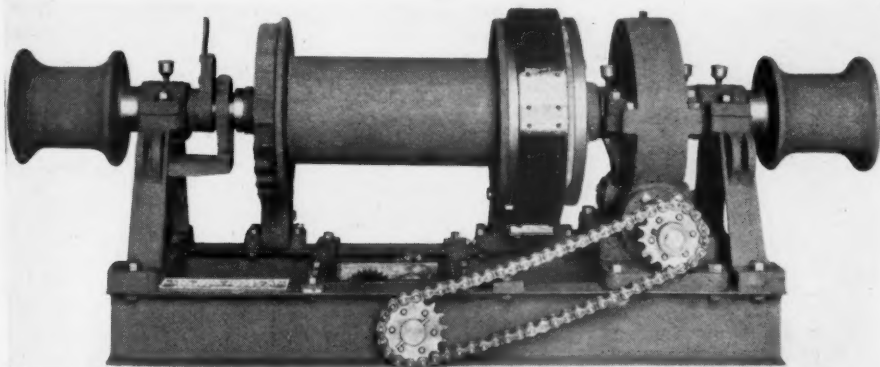
Detroit Combination Hand Press

An alarm in the form of a gong warns the operator when the travel of the screw reaches its limit. Truing-up centers and disks for crankshafts, camshafts, etc., are some of the many uses to which this apparatus may be adapted.

New Erie Motor Truck Power Winch

The Erie Hoist Co., Erie, Pa., recently came out with the announcement that it is in production with a new motor truck power winch. This winch is known as model 227-D-40.

It has a three-speed forward and power-reverse transmission and is said to embody all the refinements associated with a modern motor truck power winch. With the transmission equipment this winch can be used for raising dump bodies, by installing an upright frame back of the cab



Recently Announced Erie Motor Truck Power Winch, Model 227-D-40

with a sheave at the top for the cable to run over which raises the body. When so equipped the load can be dumped quickly. At the same time the winch is available for various other work. To make the change it is only necessary to unhook the cable from the winch which raises the body.

The power winch is an important feature for a heavy-duty truck winch in that a heavy load can be lowered slightly. As this is done by power with the reverse, possibility of snapping the cable is said to be eliminated, when depending on the brake for letting the load down.

The manufacturer advises that winches employed by house movers, riggers, construction contractors, and oil field winches should be equipped with three-speed forward and power-reverse transmission if maximum efficiency is to be obtained from a truck and winch.

The transmission is of the selective type, and its gears, shafts and bearings operate in a continual bath of oil. The entire unit is enclosed in a dirt-proof case. All the gears and parts are hardened and ground and all the shafts run in ball bearings. A standard roller chain, for which adjustment is provided, is used.

Four groups of rope speed can be furnished. The rope speeds on the drum ranging from 17 ft. per min. to 200 ft. per min. with the transmission sprocket running 600 r.p.m.

Simplex Jack

A recent addition to the well known line of Simplex jacks manufactured by the Templeton, Kenly & Co., Ltd., 1026 S. Central Ave., Chicago, Ill., is a 7½-ton model especially constructed for truck use. It is known as the No. 47 Simple Jack. In construction it is a miniature model of the Simplex 35-ton railroad jack.

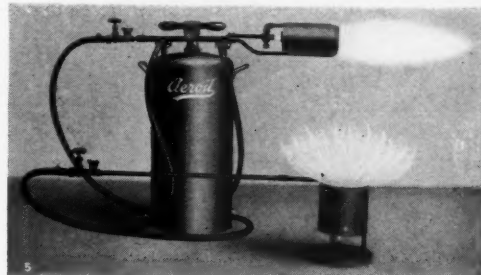
New Torch for the Auto Repair Shop

The new combination oil burner and torch offered to the repair shop trade by the Aeroil Burner Co., Union Hill, N. J., is specified as providing not only quick but intense heat.

This outfit is composed of a steel pressure tank, supplied with a hand pump,

gage, fittings, and two lengths of special oil-resisting, flexible hose.

The regular torch is capable of developing a flame 30 in. long and 3½ in. in diam.,



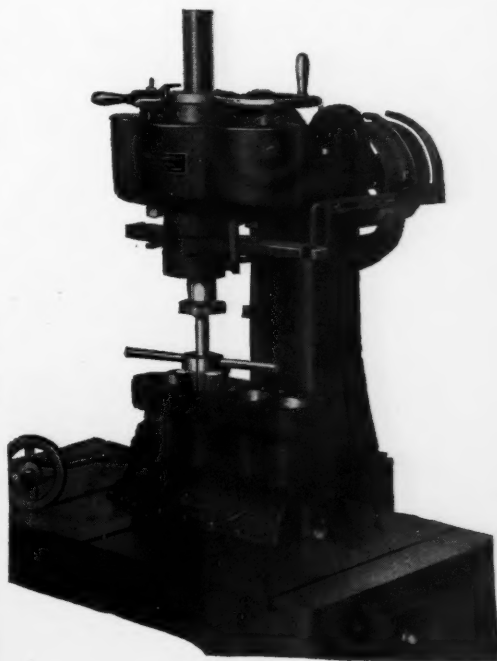
Combination Oil Burner and Torch

and an auxiliary burner attached to an extension pipe 2½ ft. long, provides a flame spread 30 in. in diam.

Hinckley-Myers Cylinder Reboring Mill

The Hinckley-Myers cylinder reboring machine offered by the Dearborn Equipment & Hinckley-Myers Co., 6 N. Michigan Blvd., Chicago, Ill., is claimed by the makers to meet with all the requirements necessary to an accurate cylinder reboring mill.

Some of its most important features are an absolute center locating device pilot



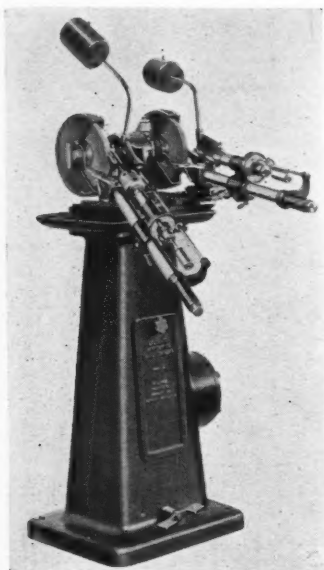
Hinckley-Myers Cylinder Reboring Mill

bar through cylinder, micrometer adjustment of each separate cutter blade, automatic stop, and entire freedom from chatter.

One hp. is sufficient to operate it, and it covers a floor space of 50 x 40 in. Net weight 1500. List price, f.o.b. Jackson, Mich., is \$750.

Bellevue Twist Drill Grinder

Sharpening a drill by hand requires both time and effort. To simplify this work, which is of utmost importance as no mechanic can work skillfully and efficiently with inadequate or dull tools, the Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit, Mich., has produced a grinder which is claimed to perform its service with absolute accuracy and in a minimum of time. It is known as the Bellevue Semi-automatic Twist Drill



Bellevue Semi-Automatic Twist Drill Grinder

Grinder. It is semi-automatic in that the actual sharpening of the drill is automatic, whereas the general movement of the entire mechanism is partly automatic.

It is pointed out by the maker that this machine will accommodate 2, 3, and 4 lip right or left-hand drills, sharpening them theoretically correct and in a short time.

Concurro Motor

The accompanying illustration shows one of the types of Concurro motors in position in its frame. This device, which



is manufactured by the C-R-S Mfg. Corp., 305 W. 54th St., New York City, reverses the motion of the engine to which it is applied so that the power when transmitted to the dead engine, the bearings of which are to be run in, will turn the dead engine in the direction it operates ordinarily.

The model shown herewith, is one designed particularly for Ford service stations. Provision is made in one of the other types for attaching to the front end of a shop car. Thus, when a dead engine is run in, the cars are faced radiator to radiator. The Concurro motor again reverses the direction, thus revolving the dead engine in the correct way.

Quality Products Universal Test Bench

The Quality Electrical Products Co., Kansas City, Mo., is offering to the trade a new Universal Test Bench for holding, driving and testing all makes and kinds of electrical units used in the automotive industry of today. This bench is featured by the company as the most simplified Universal Test Bench on the market.

The unique driving feature of this machine is obtained by the use of a four-bar parallel bracket arrangement, which holds the driving head and chuck in a parallel position in relation to the holding vise at all positions through a vertical radius of 6 inches and a horizontal radius of 12 inches. This allows the machine being tested to be instantly clamped into vise, and since vise is free to move forward and back from chuck, it can be moved forward to chuck and without any raising or lowering of machine, chuck can be moved into the plane of the shaft and be clamped to same instantly, regard-

less of the height or position of the shaft in relation to this holding vise.

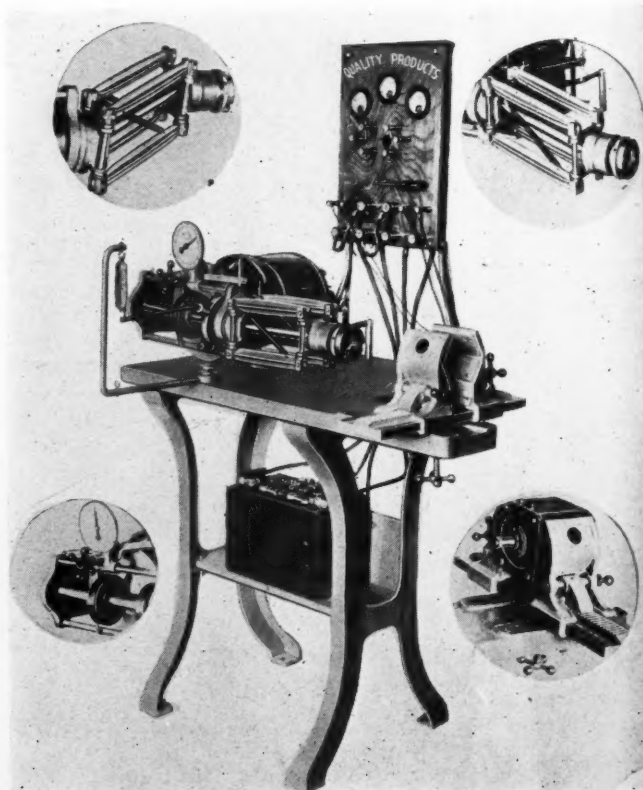
The driving shaft from friction shaft to driving head is fitted with two universal couplings which have the same centers as the four bars of parallel bracket. These two universal joints are so assembled as to give uniform speed regardless of the angle through which they are operating within the range specified above.

The holding vise is double quick acting, both jaws being movable forward and back on a ratchet bar and guide rack, being locked with two follower dogs which automatically hold jaws from being opened up or drawn apart when jaws are closed on a machine. One of these following dogs is fitted with a hand wheel, which serves to firmly lock vise jaws in position. To release vise, it is only necessary to loosen dog with hand wheel and raise dogs out of engagement with rack and move them apart, releasing machine. These features enable the operator to clamp, chuck and drive any kind or make of magneto, generator or starting motor in a moments time, and the fact that the chuck is free to move in any direction, no strain is put upon the end cap or bearings of the machine being tested. This is an important feature, since many machines of this character are made to operate through flexible couplings and the die cast frames will not withstand heavy strains which are at times imposed by various testing devices now being used by automotive electrical repair shops.

The Ford Motor Co., of Detroit, reached a new high record of production in one month in June, the total cars and trucks being 108,962. The July schedule calls for an output of 109,000 cars and trucks. This means a car or truck every 6½ seconds.

Quality Universal Test Bench

Concurro Motor in Position



Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage		ENGINE										BRAKE LINING							FRAME				
		Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width	
		No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acason RB-1 1/2—1920.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acason H-2 1/2—1920.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acason L-3 1/2—1920.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acason M-5—1920.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Ace, Series A 1 1/2—1920.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Ace, Series A2 1/2—1919-20.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme G-3 1/2.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme B-1—1916-20.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme F-1 1/2—1919-20.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme A-2—1916-20.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme AC-2 1/2—1921.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme C-3 1/2—1917-20.	3	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
Acme E-5—1919-20.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
American 25-2 1/2.	4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/2	F	11 1/2	3	1 1/2	2	11 1/2	3	1 1/2	2	112	34
American 40-4.	4	1 1/2																					

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Collier 21-2—1918-20.	3	1 1/2	1 1/2	1 1/2	V	6	1 1/2	10 1/2	1 1/2	40	1	F	27 1/2	3 1/2	1/4	4	27 1/2	3 1/2	1/4	4	132	32
Collier 22-2 1/2—1919-20.	3	1 1/2	1 1/2	1 1/2	V	6	1 1/2	10 1/2	1 1/2	40	1	F	27 1/2	3 1/2	1/4	4	27 1/2	3 1/2	1/4	4	144	32
Columbia G-2 1/2—1920.	3	1 1/2	1 1/2	1 1/2	V	11	1 1/2	10	1 1/2	38	1 1/4	F	55	3	1/4	2	50	2	1/4	2	132	32 1/2
Commerce T-1500.	3	1 1/2	1 1/2	1 1/2	V	10	1 1/2	10	1 1/2	44	1 1/4	V	50	2	1/4	2	48 1/2	2	1/4	2	92 3/4	34
Commerce 12-3000.	3	1 1/2	1 1/2	1 1/2	V	10	1 1/2	10	1 1/2	44	1 1/4	V	45	2 1/2	1/4	2	43	2 1/2	1/4	2	99 3/4	34
Commerce 16-4000.	3	1 1/2	1 1/2	1 1/2	V	10	1 1/2	10	1 1/2	44	1 1/4	V	45	2 1/2	1/4	2	43	2 1/2	1/4	2	108 3/4	34
Concord A-1 1/2—1920.	4	1 1/2	1 1/2	1 1/2	H	11	2 3/8	9 1/2	1 1/2	34	2	F	12	3 1/4	1/4	4	12	3 1/4	1/4	4	108 1/2	32 1/2
Concord B-2 1/2—1920.	4	1 1/2	1 1/2	1 1/2	H	11	2 3/8	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	122 1/2	32 1/2
Corbitt E-1—1917-20.	3	1 1/2	1 1/2	1 1/2	V	8	2	14	2	38	1	V	19	2	1/4	2	19	2	1/4	2	105	34
Corbitt D-1 1/2—1916-20.	3	1 1/2	1 1/2	1 1/2	V	8	2	14	2	38	1	V	45 1/4	2	1/4	2	45 1/4	2	1/4	2	120	34
Corbitt C-2—1915-20.	3	1 1/2	1 1/2	1 1/2	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B-2 1/2—1916-20.	3	1 1/2	1 1/2	1 1/2	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA-5—1919-20.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/4	8	1 1/4	36	2	V	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A-3 1/2—1917-20.	3	1 1/2	1 1/2	1 1/2	V	13	2	14	2	36	1 1/4	V	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Cyclone A-3000.	3	1 1/2	1 1/2	1 1/2	V	16	2	16	2	32 1/2	1 1/4	F	15	2 1/2	1/4	4	12	2 1/2	1/4	2	113	34
Dart H-1—1920-21.	3	1 1/2	1 1/2	1 1/2	H	11	2	8	1 1/2	36	1	F	19	1 1/4	1/4	4	19	1 1/4	1/4	4	102	34
Dart S-1 1/2—1920-21.	3	1 1/2	1 1/2	1 1/2	H	11	2	8	1 1/2	36	1	F	19	1 1/4	1/4	4	19	1 1/4	1/4	4	112	34
Dart M-2 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	H	11	2	14	1 1/2	35	2	F	10	2 1/4	1/4	2	19	3 1/2	1/4	4	124	34
Dart W-3 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	H	11	2	12	1 1/2	36	2	F	28	2 1/4	1/4	4	28	2 1/4	1/4	4	144	38
Day-Elder A-1.	3	1 1/2	1 1/2	1 1/2	V	9	2	9 1/2	2	40	3/8	V	19	2	1/4	4	19	2	1/4	4	108	35
Day-Elder B-1 1/2.	3	1 1/2	1 1/2	1 1/2	V	9	2	9 1/2	2	40	3/8	V	19	2	1/4	4	19	2	1/4	4	120	35
Day-Elder D-2.	3	1 1/2	1 1/2	1 1/2	V	4	1 1/2	9	1 1/2	35	3/8	V	45	2	1/4	2	45	2	1/4	2	125	35
Day-Elder C-2 1/2.	4	1 1/2	1 1/2	1 1/2	V	10 1/2	2	12	1 1/2	36 3/4	2	F	52	2 1/4	1/4	2	52	2 1/4	1/4	2	123	35
Day-Elder F-3 1/2.	4	1 1/2	1 1/2	1 1/2	V	6 1/4	1 1/2	12	1 1/2	35 1/4	1 1/2	F	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	148	35
Day-Elder E-5.	3	1 1/2	1 1/2	1 1/2	V	12 1/2	2	10	1 1/2	38 1/2	1 1/2	F	69	3	1/4	2	69	3	1/4	2	155	37
Dearborn BW-2—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	8 1/4	2	6	1 1/2	37	1	F	18	2 1/2	1/4	2	18	1 1/2	1/4	2	130	32
Dearborn F-1 1/2—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	12	2	8	1 1/2	37	1	F	16 1/2	2 1/2	1/4	2	16 1/2	1 1/2	1/4	2	96 1/2	34
Dearborn C-1—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8	1 1/2	40 3/4	1 1/4	F	38	2	1/4	1	38	2	1/4	1	107	32
Defiance B-1 1/2—1918-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8	1 1/2	40 3/4	1 1/4	F	45	2 1/2	1/4	1	43	2 1/4	1/4	1	116	34
Defiance C-2—1918-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 3/4	1 1/4	F	54	2 1/2	1/4	1	52 1/2	2 1/4	1/4	1	116	34
Defiance D—1920-21.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 3/4	1 1/4	F	45	2 1/2	1/4	1	43	2 1/4	1/4	1	120	34
Defiance E—1920-21.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 3/4	1 1/4	F	54	2 1/2	1/4	1	52 1/2	2 1/4	1/4	1	120	34
Denby 12-1—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	42	1 1/4	V	43	2 1/2	1/4	2	40	1 1/2	1/4	2	98	34
Denby 33-1 1/2—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	42	1 1/4	V	43	2 1/2	1/4	2	40	1 1/2	1/4	2	120	34
Denby 134-2—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	42	1 1/4	V	53	3	1/4	2	50 1/4	2	1/4	2	127	34
Denby 25-3—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	35	1 1/4	V	56 1/4	3	1/4	2	47 1/4	2	1/4	2	127	34
Denby 27-4—1921.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/4	16 1/4	1 1/4	39 3/4	1 1/2	F	8 1/2	4	1/4	2	58	2 1/2	1/4	2	140	34
Denby 210-5—1921.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/4	16 1/4	1 1/4	39 3/4	1 1/2	F	8 1/2	4	1/4	2	89	2 1/2	1/4	2	140	34
Dependable Dispatch A-1 1921.	4	1 1/2	1 1/2	1 1/2	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1/4	1	38 1/4	2 1/4	1/4	1	108	33 1/2
Dependable C-1 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1/4	1	38 1/4	2 1/4	1/4	1	121	33
Dependable D-2 1920-21.	4	1 1/2	1 1/2	1 1/2	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1/4	1	38 1/4	2 1/4	1/4	1	140	33
Dependable E-2 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	63	2 1/2	1/4	1	49	2 1/2	1/4	1	152	33
Dependable G-3 1/2 1921.	4	1 1/2	1 1/2	1 1/2	V	13	2	13	1 1/2	37 1/2	2	F	63	2 1/2	1/4	1	49	2 1/2	1/4	1	170	33
Diamond T-O-1.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/4	6	1 1/4	35	2	F	10 3/4	3	1/4	4	10 3/4	3	1/4	4	100	34
Diamond T-FS&T-1 1/2.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/4	6	1 1/4	35	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	Opt	34
Diamond T-U-2.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/4	6	1 1/4	35	2	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	Opt	34
Diamond TK-3 1/2.	3	1 1/2	1 1/2	1 1/2	V	10	1 1/2	10	1 1/2	35	2	F	15 1/8	3 3/4	1/4	4	15 1/8	3 3/4	1/4	4	Opt	37
Diamond T-EL-5.	3	1 1/2	1 1/2	1 1/2	V	10	1 1/2	10	1 1/2	35	2	F	18	4	1/4	4	17 1/8	4	1/4	4	Opt	37
Diamond T-S-5.	3	1 1/2	1 1/2	1 1/2	V	9	2	21	2	40 3/8	2	F	18	4	1/4	4	17 1/8	4	1/4	4	Opt	37
Diehl A.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/4	12	1 1/4	32	1 1/2	F	28	2 1/2	1/4	2	27	2	1/4	2	90	32
Doane 2 1/2—1917-18																						

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-71	4	1 1/4	1 1/4	1 3/8	V	11 3/4	1 1/4	9 1/2	1 3/4	37 1/2	1 1/4	V	15 1/2	3 3/4	1 1/4	4	15 1/2	3 3/4	1 1/4	4	Opt	38
G.M.C. K-101	4	1 1/4	1 1/4	1 3/8	V	11 3/4	1 1/4	9 1/2	1 3/4	37 1/2	1 1/4	V	17 3/4	4	1 1/4	4	17 3/4	4	1 1/4	4	Opt	38
Gove A-1-2 1/2	3	1 1/4	1 1/4	1 3/8	V	5	4	4	64	1 1/4	F	54 1/2	2 1/2	1 1/4	2	21	24 1/2	2 1/2	1 1/4	2	119 1/2	34
Graham A	3	1 1/4	1 1/4	1 3/8	V	5	4	4	64	1 1/4	F	21	2 1/2	1 1/4	2	22	24 1/2	2 1/2	1 1/4	2	140 3/4	33
Gramm-Bernstein 10 Speed—1921	3	1 1/4	1 1/4	1 3/8	V	10 3/4	2	6	2	39	1 1/4	F	48 1/2	2	1 1/4	2	45 1/2	1 1/2	1 1/4	2	97	30
Gramm-Bernstein 15-1 1/2—1921	3	1 1/4	1 1/4	1 3/8	V	10 3/4	2	6	2	39	1 1/4	F	19 3/4	1 1/4	1 1/4	4	19 3/4	1 1/4	1 1/4	4	120	32
Gramm-Bernstein 65-1 1/2—1921	3	1 1/4	1 1/4	1 3/8	V	10 3/4	2	6	2	39	1 1/4	F	45	2	1 1/4	4	45	2	1 1/4	4	120	32
Gramm-Bernstein 20-2—1921	3	1 1/4	1 1/4	1 3/8	V	11	1 1/2	12	1 1/2	32	2	F	22 3/4	2 1/4	1 1/4	4	22 3/4	2 1/4	1 1/4	4	126	32
Gramm-Bernstein 25-2 1/2—1921	3	1 1/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 1/2	2	F	22 3/4	2 1/4	1 1/4	4	22 3/4	2 1/4	1 1/4	4	129 3/4	36
Gramm-Bernstein 30—1921	3	1 1/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 1/2	2	F	22 3/4	2 1/4	1 1/4	4	22 3/4	2 1/4	1 1/4	4	129 3/4	36
Gramm-Bernstein 35-3 1/2—1921	3	1 1/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 1/2	2	F	28 3/4	2 1/4	1 1/4	4	28 3/4	2 1/4	1 1/4	4	144	36
Gramm-Bernstein 50-5—1921	3	1 1/4	1 1/4	1 3/8	V	23 3/4	2	13 3/4	1 1/2	40 3/4	2	F	32 1/2	2 1/4	1 1/4	4	32 1/2	2 1/4	1 1/4	4	162	36
G. W. W.	3	1 1/4	1 1/4	1 3/8	V	12	1 1/4	11	1 1/4	37	2	F	49	3 1/2	1 1/4	2	47	3 1/2	1 1/4	2	89	32
Hall 2-Worm-2 1/2	3	1 1/4	1 1/4	1 3/8	V	12	1 1/4	11	1 1/4	37	2	F	11 1/2	3	1 1/4	4	11 1/2	3	1 1/4	4	144	38
Hall 3 1/2-Worm	3	1 1/4	1 1/4	1 3/8	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/2	F	15	3 3/4	1 1/4	4	15	3 3/4	1 1/4	4	180	39
Hall 5-Worm	3	1 1/4	1 1/4	1 3/8	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/2	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Hall 7-Chain	3	1 1/4	1 1/4	1 3/8	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/2	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Harvey WEA-1 1/2—1919-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	46	2	1 1/4	2	46	2	1 1/4	2	120	32
Harvey WFA-2 1/2—1919-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	52	2 1/4	1 1/4	2	52	2 1/4	1 1/4	2	126 1/2	32
Harvey WHA-3 1/2—1919-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	56	2 1/2	1 1/4	2	56	2 1/2	1 1/4	2	144	35
Harvey WKA-5—1919-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	69	3	1 1/4	2	69	3	1 1/4	2	144	35
Hawkeye K-1 1/2—1918-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	48	2	1 1/4	2	47	1 1/2	1 1/4	2	112	34
Hawkeye M-2—1919-20	4	1 1/4	1 1/4	1 3/8	V	11	2 1/4	9	1 1/4	32	2	F	54	2 1/2	1 1/4	2	52	2 1/2	1 1/4	2	112	34
Hendrickson I-2 1/2	3	1 1/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	1 1/2	V	12	3 1/2	1 1/4	4	12	3 1/2	1 1/4	4	Opt	32 1/2
Hendrickson J-3 1/2	3	1 1/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	1 1/2	V	16	3 3/4	1 1/4	4	16	3 3/4	1 1/4	4	Opt	36
Hendrickson K-5	3	1 1/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	1 1/2	V	18	4	1 1/4	4	18	4	1 1/4	4	Opt	38
Highway Knight A	3	1 1/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	1 1/2	V	57	2 1/2	1 1/4	2	57	2 1/2	1 1/4	2	147	38
Highway Knight B-5	3	1 1/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	1 1/2	V	69	3	1 1/4	2	69	3	1 1/4	2	147	38
Higrade A18-1—1918-19	3	1 1/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	12	1 1/2	1 1/4	2	12	1 1/2	1 1/4	2	85	32
Higrade B20-1 1/2—1919-20	3	1 1/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	18	2	1 1/4	2	18	2	1 1/4	2	100	32
Holmes 4WD-2	3	1 1/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	24	2	1 1/4	2	46	3	1 1/4	2	120	30
Huffman B-1 1/2—1919-20	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	44	2 1/4	1 1/4	2	44	1 1/2	1 1/4	2	123	32
Huffman C-1 1/2—1919-20	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	46	2 1/2	1 1/4	2	44	2 1/4	1 1/4	2	123	32
Hurlburt A1 1/2-2	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	22	2 1/2	1 1/4	2	22	2 1/2	1 1/4	2	132	35 1/2
Hurlburt B2 1/2-4	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	24	2 1/2	1 1/4	2	23	2 1/2	1 1/4	2	154	34
Hurlburt C3 1/2-4	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	26	3	1 1/4	2	25	3	1 1/4	2	144 1/2	34
Hurlburt D5-5 1/2	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	28	3	1 1/4	2	27	3	1 1/4	2	144 1/2	34
Huron-Erie 1 1/2	4	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	15	3	1 1/4	2	50	2	1 1/4	2	121	33
Huron-Michigan 2 1/2	4	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	R	15	3	1 1/4	2	50	2 1/2	1 1/4	2	145	33
Indiana 12-1 1/2—1920	3	1 1/4	1 1/4	1 3/8	V	17	1 1/4	14	1 1/4	38 1/2	1	F	17 1/2	2	1 1/4	2	17 1/2	2	1 1/4	2	108	32
Indiana 20-2—1920	3	1 1/4	1 1/4	1 3/8	V	17	1 1/4	14	1 1/4	38 1/2	1	F	44	2	1 1/4	2	44	2	1 1/4	2	126	33
Indiana 25-2 1/2—1920	3	1 1/4	1 1/4	1 3/8	V	17	1 1/4	14	1 1/4	38 1/2	1	F	51	2 1/4	1 1/4	2	51	2 1/4	1 1/4	2	138	33
Indiana 35-3 1/2—1920	3	1 1/4	1 1/4	1 3/8	V	17	1 1/4	14	1 1/4	38 1/2	1	F	56	2 1/2	1 1/4	2	56	2 1/2	1 1/4	2	144	34 1/2
Indiana 51-5—1920	3	1 1/4	1 1/4	1 3/8	V	17	1 1/4	14	1 1/4	38 1/2	1	F	68	3	1 1/4	2	68	3	1 1/4	2	156	37 1/2
International S-1500 lbs.—Speed Truck '21	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	F	38	2	1 1/4	2	36	2	1 1/4	2	90	34
International 21-2000 lbs.—1916-21	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	F	43 3/4	2 1/4	1 1/4	2	43 3/4	2 1/4	1 1/4	2	75 1/2	34
International 31-3000 lbs.—1916-21	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	F	43 3/4	2 1/4	1 1/4	2	43 3/4	2 1/4	1 1/4	2	88 1/2	34
International 41-4000 lbs.—1918-21	3	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	F	50 3/4	2 1/4	1 1/4	2	50 3/4	2 1/4	1 1/4	2	91 1/2	34
International 61-6000 lbs.—1918-21	4	1 1/4	1 1/4	1 3/8	V	10	2 1/4	9	1 1/4	32	1 1/2	F	50 3/4	2 1/4	1 1/4	2	50 3/4	2 1/4	1 1/4	2	118 1/2	34
International 101-10,000 lbs.—1920-21	4	1 1/4	1 1/4	1 3/8</																		

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
L. M. C. 2-1/2—1919-20	3	3/4	1 1/4	1 1/4	V	10	1 1/2	14	1 1/4	35	1 1/4	F	55	3	1/8	2	50 1/2	2	1/8	2	143	32
Luedinghaus K2—1919-20	3	3/4	1 1/4	1 1/4	V	9	1 1/4	14	1 1/4	35	1 1/4	F	53.4	2 1/2	1/8	2	38 1/2	2	1/8	2	120	34
Luedinghaus K2-LS—1920	3	3/4	1 1/4	1 1/4	V	9	1 1/4	14	1 1/4	35	1 1/4	F	53.4	2 1/2	1/8	2	38 1/2	2	1/8	2	145 1/2	34
Luerne BBL-2	3	3/4	1 1/4	1 1/4	V	9	1 1/4	14	1 1/4	35	1 1/4	F	53.4	2 1/2	1/8	2	38 1/2	2	1/8	2	108	34
Maccar L-1 1/2—1915-20	3	3/4	1 1/4	1 1/4	V	3 1/2	1 1/2	10	1 1/4	30 3/4	1 1/4	F	11 1/4	3 1/4	1/8	4	11 1/4	3 1/4	1/8	4	128 1/2	34
Maccar H-2, 2 1/4—1921	3	3/4	1 1/4	1 1/4	V	9 1/2	1 1/2	15 1/2	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1/8	4	13	3 1/2	1/8	4	143 1/2	34
Maccar M2-3 1/2—1920	3	3/4	1 1/4	1 1/4	V	8	1 1/4	13 1/2	1 1/2	37 1/2	1 1/2	F	15 1/2	3 1/4	1/8	4	15 1/2	3 1/4	1/8	4	155 1/2	34
Maccar G-5—1919-20	3	3/4	1 1/4	1 1/4	V	10 1/2	2	20 1/2	2	40 1/4	2	F	17 1/4	4	1/8	4	17 1/4	4	1/8	4	167	37 1/2
MacDonald A-7 1/2	4	4	1 1/4	1 1/4	V	12	2	21	1 1/4	35	2	F	70	3	1/8	1	34	2 1/2	1/8	1	Opt	33 1/2
Mack AB 1 1/2, 2, 2 1/2—Ton-Chain 16-20	4	4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/2	33	1 1/2	F	12 1/2	4	1/8	2	16 1/2	2 1/2	1/8	2	Opt	33 1/2
Mack Dual Reduction 1 1/2, 2, 2 1/2—1921	4	4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/2	33	1 1/2	F	18 1/2	3 1/2	1/8	4	12	2 1/2	1/8	4	Opt	33 1/2
Mack AB-Tractor 5 Ton—16-20	4	4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/2	33	1 1/2	F	12 1/2	4	1/8	2	16 1/2	2 1/2	1/8	4	77	33 1/2
Mack AC 3 1/2 to 7 1/2 ton—16-20	4	4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/2	33	1 1/2	F	12 1/2	4	1/8	2	16 1/2	2 1/2	1/8	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton—16-20	4	4	1 1/4	1 1/4	V	5 1/2	2 1/4	4 1/2	2 1/4	1	1	V	16 1/2	3	1/8	4	20 1/2	3 1/2	1/8	4	87	37 1/2
Master JI-1 1/2—1919-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/2	1/8	1	117 1/2	34 1/2
Master JW-1 1/2—1919-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/2	1/8	1	156 1/2	34
Master M-2 1/2—1916-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/2	1/8	1	117 1/2	34
Master O-2 1/2—1917-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/2	1/8	1	156 1/2	34
Master W-2 1/2—1916-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/2	3 1/2	1/8	2	13 1/2	3 1/2	1/8	2	117 1/2	34
Master WL 2 1/2—1917-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/2	3 1/2	1/8	2	13 1/2	3 1/2	1/8	2	156 1/2	34
Master D-2 1/2—1920-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	4 1/2	1/8	2	54 1/2	3	1/8	2	117 1/2	34
Master DL-2 1/2—1920-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	4 1/2	1/8	2	54 1/2	3	1/8	2	156 1/2	34
Master T-6 Tractor—1917-21	3	3/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/2	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/2	1/8	1	172 1/2	34
Master A-3 1/2—1918-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1/8	2	16	3 1/4	1/8	2	147 1/2	36 1/2
Master AL-3 1/2—1918-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1/8	2	16	3 1/4	1/8	2	183 1/2	36 1/2
Master E-3 1/2—1920-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1/8	2	25	4	1/8	2	147 1/2	36 1/2
Master EL-3 1/2—1920-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1/8	2	25	4	1/8	2	183 1/2	36 1/2
Master B-5—1919-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	18	4	1/8	2	18	4	1/8	2	162 1/2	39
Master BL-5—1919-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	18	4	1/8	2	18	4	1/8	2	186 1/2	39
Master F-5—1920-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	11	6	1/8	2	25	4	1/8	2	162 1/2	39
Master FL-5—1920-21	4	4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	11	6	1/8	2	25	4	1/8	2	186 1/2	39
Maxwell 1 1/2—1917-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	16	1 1/2	1/8	4	16	1 1/2	1/8	4	102	36
Menominee HT-1—1918-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	12	3 1/4	1/8	8	12	3 1/4	1/8	8	104	32
Menominee H-1 1/2—1916-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	13 1/2	3 1/2	1/8	8	13 1/2	3 1/2	1/8	8	122	32
Menominee D-2—1915-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	13 1/2	3 1/2	1/8	8	13 1/2	3 1/2	1/8	8	146	32
Menominee G-3 1/2—1916-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	16	3 1/2	1/8	8	16	3 1/2	1/8	8	149	36
Menominee J-5—1917-20	3	3/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	18 1/2	4	1/8	8	18 1/2	4	1/8	8	149	38
Menominee Ht-1—1920-late	3	3/4	1 1/4	1 1/4	H	9 1/2	1 1/2	10 1/2	1 1/2	33 3/4	1 1/2	F	47 1/2	2 1/2	1/8	2	33 3/4	2 1/2	1/8	2	102 1/2	32
Menominee H-1—1920-late	3	3/4	1 1/4	1 1/4	H	9 1/2	1 1/2	10 1/2	1 1/2	33 3/4	1 1/2	F	47 1/2	2 1/2	1/8	2	33 3/4	2 1/2	1/8	2	124	32
Menominee D-2—1920-late	3	3/4	1 1/4	1 1/4	H	3	1 1/2	3	1 1/2	37 3/4	1 1/2	F	57 1/2	2 1/2	1/8	2	42 1/2	2 1/2	1/8	2	131 1/2	32
Menominee G-3 1/2—1920-late	3	3/4	1 1/4	1 1/4	H	3	1 1/2	3	1 1/2	37 3/4	1 1/2	F	57 1/2	2 1/2	1/8	2	42 1/2	2 1/2	1/8	2	149	36
Menominee J-5—1920-late	3	3/4	1 1/4	1 1/4	H	3	1 1/2	3	1 1/2	40 3/4	1 1/2	F	69 1/2	3 1/2	1/8	2	52	2 1/2	1/8	2	149	38
Moline	3	3/4	1 1/4	1 1/4	H	10 1/2	2 1/4	4 1/2	2 1/4	2	2	F	21	2	1/8	2	20	2	1/8	2	108	34
Moreland 21B-1 1/2—1919-20-21	3	3/4	1 1/4	1 1/4	V	19	1 1/4	17	1 1/2	37 1/2	2	F	51	2 1/4	1/8	2	51	2 1/4	1/8	2	132	34
Moreland 21C-2 1/2—1919-20-21	3	3/4	1 1/4	1 1/4	V	19	1 1/4	17	1 1/2	37 1/2	2	F	51	2 1/4	1/8	2	51	2 1/4	1/8	2	160	34
Moreland 21H-4—1919-20-21	3	3/4	1 1/4	1 1/4	V	19	1 1/4	17	1 1/2	37 1/2	2	F	16	3 1/4	1/8	4	16	3 1/4	1/8	4	168	38
Moreland 21J-5—1919-20-21	3	3/4	1 1/4	1 1/4	V	19	1 1/4	17	1 1/2	37 1/2	2	F	18	4	1/8	4	18	4	1/8	4	168	38
Mutual 2B—1919-20	3	3/4	1 1/4	1 1/4	V	19	1 1/4	17	1 1/2	37 1/2	2	F	51	2 1/4	1/8	2	51	2 1/4	1/8	2	128 1/2	34
Mutual 2BP—1919-20-																						

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Pierce Arrow-2-X-5	3	1 1/4	1 1/4	1 1/4	V	16 3/4	2	14 1/4	1 3/4	43 1/2	1 1/2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	125 1/2	34 1/4
Pierce Arrow-3 1/2-W-2	3	1 1/4	1 1/4	1 1/4	V	11 1/2	2	15 1/2	1 3/4	43 1/2	1 1/2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	133 1/4	38 1/4
Pierce Arrow-5-R-10	3	1 1/4	1 1/4	1 1/4	V	11 1/2	2	15 1/2	1 3/4	43 1/2	1 1/2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	139 1/4	38 1/4
Pittsburgher 2 1/2-1919-20	3	1 1/4	1 1/4	1 1/4	V	6	1 1/2	12	1 1/4	37	1 1/2	F	44 1/2	2 1/4	1 1/4	2	44 1/2	2 1/4	1 1/4	2	136	33
Rainier R-8-2	3	1 1/4	1 1/4	1 1/4	V	5	1 1/2	13	1 1/4	31 1/2	1 1/2	F	44 1/2	2 1/4	1 1/4	2	44 1/2	2 1/4	1 1/4	2	113	34
Rainier R-6-1 1/2	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/4	41	1 1/2	F	19	2 1/4	1 1/4	2	19	2 1/4	1 1/4	2	100	34
Rainier R-19-1	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/4	42	1 1/2	F	19	2 1/4	1 1/4	2	19	2 1/4	1 1/4	2	90	34
Rainier R-11-3/4	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14 1/2	1 1/4	42	1 1/2	F	19	2 1/4	1 1/4	2	19	2 1/4	1 1/4	2	106 1/2	33
Ranger TK-20-2	3	1 1/4	1 1/4	1 1/4	V	11 1/2	1 1/2	10 1/2	1 1/4	33 3/4	1 1/2	F	11 1/2	3 1/4	1 1/4	2	11 1/2	3 1/4	1 1/4	2	122	32
Reliance 10A-1 1/2-1920	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 3/4	35	2	F	17	2 1/4	1 1/4	2	17	2 1/4	1 1/4	2	122	32
Reliance 20B-2 1/2-1920	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 3/4	35	2	F	17	2 1/4	1 1/4	2	17	2 1/4	1 1/4	2	122	32
Reo P-1500-2500-lbs	3	1 1/4	1 1/4	1 1/4	V	5 1/2	1 1/2	5 1/2	1 1/2	39	1 1/2	F	43	2 1/4	1 1/4	2	43	2 1/4	1 1/4	2	82	30
Republic 10-1-10E-1-1919-20-21	3	1 1/4	1 1/4	1 1/4	V	12 1/4	2	6	2	40	1 1/4	F	20 1/4	2 1/4	1 1/4	1	39 3/4	2 1/4	1 1/4	1	98	34
Republic 11X-1 1/2-1919-20-21	3	1 1/4	1 1/4	1 1/4	V	12 1/4	2	6	2	40	1 1/4	F	20 1/4	2 1/4	1 1/4	1	39 3/4	2 1/4	1 1/4	1	118	34
Republic 19-2 1/2-1919-20-21	3	1 1/4	1 1/4	1 1/4	V	12 1/4	2	6	2	40	1 1/4	F	20 1/4	2 1/4	1 1/4	1	39 3/4	2 1/4	1 1/4	1	121	34
Republic 20-3 1/2-1919-20-21	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	11 1/2	1 1/4	32	1 1/2	F	54 1/2	2 1/4	1 1/4	2	24 1/4	2 1/4	1 1/4	2	146	37
Republic 75-3/4-1921	3	1 1/4	1 1/4	1 1/4	V	12	2 1/4	18 1/2	2 1/4	36 1/4	1 1/2	F	55 1/2	2 1/4	1 1/4	2	30 1/2	2 1/4	1 1/4	2	95	31
Reynolds 3A-1 1/2	3	1 1/4	1 1/4	1 1/4	V								46	2 1/4	1 1/4	2	18	2 1/4	1 1/4	2	121	33
Reynolds 5A-2 1/2	3	1 1/4	1 1/4	1 1/4	V								52 1/2	2 1/4	1 1/4	2	52 1/2	2 1/4	1 1/4	2	126	33
Reynolds 7A-3 1/2	3	1 1/4	1 1/4	1 1/4	V								57	2 1/4	1 1/4	2	57	2 1/4	1 1/4	2	148	37
Reynolds 10A-5	3	1 1/4	1 1/4	1 1/4	V								70	3 1/4	1 1/4	2	70	3 1/4	1 1/4	2	150	38
Riker R3-BB-4	5	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	8	1 1/4	49 1/2	1 1/2	V	7 1/4	4 1/2	1 1/4	2	7 1/4	4 1/2	1 1/4	2	113	33
Rowe CW-1 1/2-1918-19-20	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	32	1 1/2	F	19	2 1/4	1 1/4	2	19	2 1/4	1 1/4	2	123	33
Rowe CDW2-1916-20	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	32	1 1/2	F	45	2 1/4	1 1/4	2	45	2 1/4	1 1/4	2	146	36
Rowe GSW3-1918-20	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/4	1 1/2	F	51 1/2	2 1/4	1 1/4	2	51 1/2	2 1/4	1 1/4	2	153	38 1/4
Rowe HW4-1918-20	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/4	1 1/2	F	56 1/2	2 1/4	1 1/4	2	56 1/2	2 1/4	1 1/4	2	152	33
Rowe FW5-1914-20	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/4	1 1/2	F	68	3	1 1/4	4	68	3	1 1/4	4	153	38 1/4
Rowe GPW3-1916-17, 1919-20	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	6	1 1/4	37	2	F									152	33
Rumely A-1 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	37	2	F	18	2 1/4	1 1/4	2	18	2 1/4	1 1/4	2	122	34
Sandow G-1-1918-20	3	1 1/4	1 1/4	1 1/4	V								20	2 1/4	1 1/4	2	20	2 1/4	1 1/4	2	96	34
Sandow CG-1 1/2-1918-20	3	1 1/4	1 1/4	1 1/4	V								20	2 1/4	1 1/4	2	20	2 1/4	1 1/4	2	120	34
Sandow I-2-1918-20	3	1 1/4	1 1/4	1 1/4	V								60	3 1/2	1 1/4	2	60	3 1/2	1 1/4	2	132	32
Sandow J-2 1/2-1918-20	3	1 1/4	1 1/4	1 1/4	V								63 1/2	3 1/2	1 1/4	2	63 1/2	3 1/2	1 1/4	2	144	37
Sandow L-5-1918-20	3	1 1/4	1 1/4	1 1/4	V								24	4 1/2	1 1/4	2	24	4 1/2	1 1/4	2	144	37
Sandow M-3 1/2-1918-20	3	1 1/4	1 1/4	1 1/4	V								18 1/2	4 1/2	1 1/4	2	18 1/2	4 1/2	1 1/4	2	144	37
Sanford 25-2 1/2-1917-20	3	1 1/4	1 1/4	1 1/4	V								51 1/2	2 1/4	1 1/4	2	51 1/2	2 1/4	1 1/4	2	144	35
Sanford W35-2 1/2-1917-20	3	1 1/4	1 1/4	1 1/4	V								56	2 1/4	1 1/4	2	56	2 1/4	1 1/4	2	145	35
Sanford W50-5-1917-20	3	1 1/4	1 1/4	1 1/4	V								69	3	1 1/4	2	69	3	1 1/4	2	145	35
Schacht 2	3	1 1/4	1 1/4	1 1/4	V								8 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	140	35 1/4
Schacht 2 1/2	3	1 1/4	1 1/4	1 1/4	V								8 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	140	35 1/4
Schacht 3 1/2	4	1 1/4	1 1/4	1 1/4	V								8 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	152	35 1/4
Schacht 5	4	1 1/4	1 1/4	1 1/4	V								8 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	152	35 1/4
Selden 1 1/2A-1919-20	3	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/2	41	1 1/2	F	11 1/2	3 1/4	1 1/4	2	11 1/2	3 1/4	1 1/4	2	114	34
Selden 2 1/2A-1920	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	5 1/2	1 1/2	34 1/4	1 1/2	F	15 1/2	3 1/4	1 1/4	2	15 1/2	3 1/4	1 1/4	2	134	34
Selden 3 1/2A-1919-20	3	1 1/4	1 1/4	1 1/4	V	7	2	20 1/2	1 1/2	40 3/4	1 1/2	F	18	3 1/4	1 1/4	2	18	3 1/4	1 1/4	2	153	37 1/4
Selden 5A-1920	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	6	1 1/4	35	1 1/2	F	19 1/2	3 1/4	1 1/4	2	19 1/2	3 1/4	1 1/4	2	153	37 1/4
Service 15-1921-3	3	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	109 1/2	34
Service 220-1-1919-20	3	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	121	34
Service 31-1 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	121	34
Service 36-1 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	121	34
Service 51-2 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	13 1/2	3 1/4	1 1/4	2	13 1/2	3 1/4	1 1/4	2	131 1/2	34
Service 71-3 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	37 1/2	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	150 1/2	38
Service 76-3 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/4	38 1/4	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	145 1/4	38
Service 101-5-1919-20	4	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/4	38 1/4	1 1/2	F	18 1/2	4 1/4	1 1/4	2	18 1/2	4 1/4	1 1/4	2	145 1/4	38
Signal NF-1	3	1 1/4	1 1/4	1 1/4	V								11	3 1/4	1 1/4	2	11	3 1/4	1 1/4	2	120	34
Signal H 1 1/2	3	1 1/4	1 1/4	1 1/4	V								12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	126	34
Signal J-2 1/2	3	1 1/4	1 1/4	1 1/4	V								13 1/2	3 1/4	1 1/4	2	13 1/2	3 1/4	1 1/4	2	168	38
Signal M 3 1/2	3	1 1/4	1 1/4	1 1/4	V								16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	172	38
Signal R-5	3	1 1/4	1 1/4	1 1/4	V								18	4								

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency				Length	Width		
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Transport 50-2½	3	¾	1¼	1¼	V	9¼	2	10	1¼	32¾	2	F	10¼	3½	¼	4	48½	2½	¼	2	123	34
Transport 70-3½	4	¾	1¼	1¼	V	12	2	16	1¼	35½	2	F	11½	3	¼	4	58	2½	¼	2	150	36½
Traylor B-1½	4	¾	1¼	1¼	V	12	2	16	1¼	38	2	F	50	2	¼	2	50	2	¼	2	117	34
Traylor C-2	4	¾	1¼	1¼	V	12	2	16	1¼	36	2	F	50	2	¼	2	50	2	¼	2	122	34
Traylor D-3	4	¾	1¼	1¼	V	12	2	16	1¼	36	2	F	56½	2¼	¼	2	56½	2¼	¼	2	142	34
Traylor E-4	4	¾	1¼	1¼	V	12	2	16	1¼	37	2	F	59	2½	¼	2	59	2½	¼	2	165	35
Traylor F-5	4	¾	1¼	1¼	V	12	2	16	1¼	37	2	F	59	2½	¼	2	59	2½	¼	2	165	35
Triangle AA-¾—1920.	3	¾	1	1	H	17	3	17	3	34	1	F	22	2½	¼	1	41	2	¼	2	94	34
Triangle A-1½—1918-20.	3	¾	1	1	H	14	1¼	14½	1¼	39¼	1¼	F	7	4	¼	2	49	2	¼	2	126	34
Triangle B-2½—1919-20.	3	¾	1¼	1¼	V	18	1¼	18	1¼	39¼	1¼	F	7	4	¼	2	49	2	¼	2	132	34
Triangle C-2—1920.	3	¾	1	1	V	14	1¼	14½	1¼	39¼	1¼	F	7	4	¼	2	52	3	¼	2	129	34
Triumph HB-2½	4	¾	1¼	1¼	V	9	9	17	1¼	32½	2	F	46	2½	¼	2	32	2½	¼	2	120	34½
Triumph HC-2	4	¾	1¼	1¼	V	9	9	17	1¼	32½	2	F	46	2½	¼	2	32	2½	¼	2	120	34½
Twin City 2	4	¾	1¼	1¼	V	11	2	13	1¼	36½	2	F	50	3	¼	2	48	2½	¼	2	132	33
Twin City 3½	4	¾	1¼	1¼	V	11	2	13	1¼	36½	2	F	50	3	¼	2	48	2½	¼	2	132	33
Ultimate A-2—1920.	4	¾	1¼	1¼	V	8	8	8	1¼	34	2	F	15	3¼	¼	4	15	3¼	¼	4	156	36
Ultimate AJ2—1920.	4	¾	1¼	1¼	V	11	2	8	1¼	34	2	F	45	2	¼	2	45	2	¼	2	126	32½
Ultimate AJL-2-1920.	4	¾	1¼	1¼	V	11	2	8	1¼	34	2	F	45	2	¼	2	45	2	¼	2	150	32½
Ultimate B-3—1920.	4	¾	1¼	1¼	V	11	2	8	1¼	34	2	F	51	2¼	¼	2	51	2¼	¼	2	144	32½
Ultimate BL3—1920.	4	¾	1¼	1¼	V	11	2	8	1¼	34	2	F	51	2¼	¼	2	51	2¼	¼	2	192	32½
Union F-2½	3	¾	1¼	1¼	V	20	1¼	19½	1½	37¾	2	F	55	3	¼	1	50	2	¼	1	133½	32
Union FW-2½	3	¾	1¼	1¼	V	20	1¼	19½	1½	37¾	2	F	55	3	¼	1	50	2	¼	1	133½	32
Union H-4	3	¾	1¼	1¼	V	20	1¼	19½	1½	37¾	2	F	56¼	3¼	¼	1	24	4½	¼	1	157½	34
Union HW-4	3	¾	1¼	1¼	V	20	1¼	19½	1½	37¾	2	F	26	4½	¼	1	24	4½	¼	1	157½	34
Union JW-6	3	¾	1¼	1¼	V	20	1¼	19½	1½	37¾	2	F	34	4	¼	1	28	5	¼	1	190	36
United 1½	3	¾	1¼	1¼	V	15	2½	16	1½	41½	2	F	48	4	¼	1	48	4	¼	1	120	33
United 2½	3	¾	1¼	1¼	V	7	7	12	1½	37¾	2	F	49	3	¼	1	48	2½	¼	1	Opt	33
United 3½	3	¾	1¼	1¼	V	7	7	12	1½	37¾	2	F	62	3	¼	1	48	2½	¼	1	Opt	33
United 6	3	¾	1¼	1¼	V	14½	2	12	1½	37¾	2	F	88½	2¼	¼	1	88½	2¼	¼	1	Opt	33
U.S.N.-1½	3	¾	1¼	1¼	H	11½	2	9	1¼	37	1¼	F	50	2½	¼	2	46½	1½	¼	2	120	34
U.S.R.-2½-3	3	¾	1¼	1¼	V	10	1¼	9	1¼	35	1¼	F	46	2½	¼	2	46	2½	¼	2	144	34
U.S.S.-3½-4	3	¾	1¼	1¼	V	9	1¼	8	1¼	37	1¼	F	50	2½	¼	2	50	2½	¼	2	156	36
U.S.T.-5-6	3	¾	1¼	1¼	V	15	2	13	1½	38¾	2	F	62	3	¼	2	52	2¼	¼	2	168	36
Velie 46-1½—1921.	3	¾	1¼	1¼	V	9½	2	12¼	1½	40	1	F	54	2½	¼	2	33	2¼	¼	2	120	31
Vim 29-¾	3	¾	1¼	1¼	V	11	2	12	1½	30¾	1	F	14½	1½	¼	4	14½	1½	¼	4	84	30
Vim 30-¾	3	¾	1¼	1¼	V	11	2	12	1½	30¾	1	F	14½	1½	¼	4	14½	1½	¼	4	83½	32
Vim 31-1	4	¾	1¼	1¼	V	11	2	12	1½	40	1	F	18	2	¼	4	42½	2	¼	4	92	32
Vim 22-2	4	¾	1¼	1¼	V	11	2	12	1½	40	1	F	42½	2	¼	4	42½	2	¼	4	120½	34
Vim 23-3	4	¾	1¼	1¼	V	11	2	12	1½	40	1	F	48½	2¼	¼	2	48½	2¼	¼	2	160	34
Walker M½	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	43	2¼	¼	2	43	2¼	¼	2	90	32
Walker K1	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	45½	2¼	¼	2	45½	2¼	¼	2	96	32
Walker L2	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	53¼	2¼	¼	2	53¼	2¼	¼	2	120	32
Walker P3½	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	53¼	2¼	¼	2	53¼	2¼	¼	2	140	35
Walker N5	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	53¼	2¼	¼	2	53¼	2¼	¼	2	162	35
Walker-Johnson B2½	4	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	13	3½	¼	4	13	3½	¼	4	133	32
Walter S-5	3	¾	1¼	1¼	V	10	1¼	18	1½	39	1½	F	15	3½	¼	4	15	3½	¼	4	150	36
Ward LaFrance 2B-2½-3—1920.	3	¾	1¼	1¼	V	7	7	12	1½	41½	1½	F	13	3½	¼	4	13	3½	¼	4	137½	37
Ward LaFrance 4A-3½-4—1920.	3	¾	1¼	1¼	V	8½	1½	18	1½	41½	1½	F	15½	3¼	¼	4	15½	3¼	¼	4	170	37
Ward LaFrance 5A-5-6—1920.	3	¾	1¼	1¼	V	9¼	1½	18	1½	41½	1½	F	18	4	¼	4	18	4	¼	4	170	37
Ward WS2	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	14½	1½	¼	4	14½	1½	¼	4	66	34
Ward WA	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	18	2	¼	4	18	2	¼	4	95	33
Ward WB	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	19½	2	¼	4	19½	2	¼	4	120	33
Ward WD	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	49½	2½	¼	4	49½	2½	¼	4	144	33
Ward WF	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	55	2½	¼	4	55	2½	¼	4	168	34½
Ward WH	4	¾	1¼	1¼	V	11	2	12	1½	41½	1½	F	68½	3	¼	4	68½	3	¼	4	192	37
Watson B1	4	¾	1¼	1¼	V	16½	1¼	4	1¼	40	1½	F	41	1¼	¼	2	41	1¼	¼	2	90½	30
Watson N-3½	3	¾	1¼	1¼	V	16½	1¼	3	1¼	34	1¼	F	62	2½	¼	4	47	2½	¼	4	147	37
Watson U-5	3	¾	1¼	1¼	V	16½	1¼	3	1¼	34	1¼	F	15½	3¼	¼	4	15½	3¼	¼	4	157	36
White 15-¾	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	13½	3½	¼	4	13½	3½	¼	4	85½	34
White 20-2	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	11½	3½	¼	4	11½	3½	¼	4	107½	34
White 40-3	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	11½	3½	¼	4	11½	3½	¼	4	157	42
White 45-5	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	11½	3½	¼	4	11½	3½	¼	4	157	42
White Hickory H-1½—1919	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	13½	3½	¼	4	13½	3½	¼	4	116¼	32
White Hickory H-1½—1920	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	11½	3½	¼	4	11½	3½	¼	4	116¼	32
White Hickory E-1—1920.	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	13½	3½	¼	4	13½	3½	¼	4	92¼	32½
White Hickory K-2½—1920.	3	¾	1¼	1¼	V	11	2	8	1¼	41	1½	V	13½	3½	¼	4	13½	3½	¼	4	150	32
Wichita K-1—1915-20-21.	3	¾	1¼	1¼	V	18½	1¼	12	1¼	52½	1½	F	49	2	¼	2	49	2	¼	2	127½	30
Wichita L-1½—1916-20-21.	3	¾	1¼	1¼	V	18½	1¼	12	1¼	52½	1½	F	49	2	¼	2	49	2	¼	2	127½	30
Wichita M-2—1915-20-21.	3	¾	1¼	1¼	V	18½	1¼	12	1¼	52½	1½	F	54	2	¼	2	54	2	¼	2	126½	30
Wichita R-2½—1917-20-21.	3	¾	1¼	1¼	V	18½	1¼	12	1¼	52½	1½	F	54	2	¼	2	54	2	¼	2	130	30
Wichita RX-2½—1919-20-21.	4	¾	1¼	1¼	V	5	5	11	1¼	40	1½	F	56½	2½	¼	2	56½	2½	¼	2	152½	36
Wichita O-3½—1915-20-21.	4	¾	1¼	1¼	V	5	5	11	1¼	40	1½	F	66	2	¼	2	66	2	¼	2	163½	36
Wichita S-5—1919-20																						

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		Make and Model	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System		Engine Starter	Make				Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Wheels (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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* Dodge Brothers	885	Own	3 1/2 x 4 1/2	24	L	C	McC	PT	FS	Stew	V	Own	DD	Own	NE	W	U	U	U	U</

[illegible]

Triangle A.....	2350	Wau BUX	3 3/4 x 6 1/4	22 5/8 L	C	C	Per	ZGT	ES	Strm	G	Wau	Full	DD	Els	Full	U	3	UP	Det	Cl	D	7-25	21	Gem	34-314	34-6	Roy	Flr	3750 144 60
Ultimate Z.....	3200	Buda LTU	4 x 8 1/2	25 6/8 L	C	C	Own	PT	W	Strm	G	Pier	B-Li	DD	Els	Eos	B-Li	U	3	Spic	Shel	W	6.5	6.5	Ros	38-25 1/2	38-6	Jon	Flr	4500 186 72	
United A-1 1/2.....	2445	Buda C711	3 3/4 x 6 1/4	22 5/8 L	C	C	Mod	PT	F	Strm	G	Sim	Full	DD	Els	Op	U	3	U	Rld	Bea	7	8	30.4	190	30-25 1/2	30-6	Jon	Flr	4500 186 72	
United II 40.....	2500	Buda C711	3 3/4 x 6 1/4	22 5/8 L	C	C	Mod	PT	F	Strm	G	Sim	Full	DD	Els	Op	U	3	U	Rld	Bea	7	8	30.4	190	30-25 1/2	30-6	Jon	Flr	4500 186 72	

†Chassis only

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET			REAR AXLE		TIRES, WHEELS, RIMS				Chassis Weight	Wheelbase	P.R. Cont of Weights on Rear Wheel										
		Make and Model	Bore and Stroke	N. A. C. C.	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)				Springs (Make)	Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear	Tires		Rim Equipment
																															Front	Rear		(Make)	(Make)
2 Ton—Con'd																																	
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	22	33	36x6*	38x7*	3700	136 1/2	6		
Wau CAU	3300	3 1/2 x 5 1/2	22 1/2 x 5 1/2	L	C	Bus	Fin	Fin	Zen	Sheb	GGGG	Sim	Full	PT	Spl	W	Tim	1 1/2 Fl	9.25	29.97	Dit	36x6*	38x7*	Bim	2								

[illegible]

† Chassis Only

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		STEERING GEAR		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Ft. Cent of Wheel on Rear Wheel					
		Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	Cooling	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Type	Total Gear Ratio	Total Gear Ratio							
3 Ton-Con'd																											
Ultimate BL	3850	4 1/2 x 5 1/2	28.9	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
U. S. R.	3850	4 1/2 x 5 1/2	28.9	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Vim 28	3600	4 1/2 x 5 1/2	28.9	H	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Wichita RX		4 1/2 x 5 1/2	28.9	H	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
3 1/2 Ton																											
Acson L	4295	4 1/2 x 5 1/2	30.6	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Acme C	3975	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Apex F		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Armstrong KW		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Atterbury 7D-LWB	4275	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Atterbury 7D-LWB	4175	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Autocar Y	4350	4 1/2 x 5 1/2	28.9	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Autocar B	4350	4 1/2 x 5 1/2	28.9	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Available H3 1/2	4475	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Belmont D	3850	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Brookway 4C	4100	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Brookway R-4	4425	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Capitol M-3 1/2		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Chicago C3 1/2		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Clydesdale 90C	4100	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Corbett A	6100	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Couple Gear HC		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Dart W	3750	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Day Elder F	3575	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Dependable G 3 1/2	3575	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Diamond T-K	5100	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Doane 3 1/2	4250	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Dorrie K		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*Duplex E		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Federal 4500	3950	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Federal WB	4050	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Garford 77D	4150	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Gary K		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
Quant 7		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71	4375	4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71		4 1/2 x 5 1/2	32.4	L	C	C	Can	PT	FS	Shel	G	Pier	DD	DD	Eis	Op	13	14	15	16	17	18	19	20	21	22	23
*C. M. C. K-71</																											

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Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		Universal (Make)		Sproings (Make)		REAR AXLE		Tires, Wheels, Rims		Chassis Weight	Wheelbase	P.R. Cont of Weights	
		Make and Model	N.A.C.C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Type	Total Gear Ratio	Total Gear Ratio	Steering Gear	Front	Rear	Wheels (Make)	Rim Equipment	
5 Ton—Cont'd																									
Kleiber-Devo W.	4800	Buda BTU	40	L	RT	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	11.66	56.48	Ros	36x6	40x6	Smi	23	9200 180 75
Macdon G.	5500	Cont B2	36.1	L	Bus	Fin	Fin	FS	Zen	G	Con	B-Li	DD	Eis	W	Shel	Flot	10.2	51.83	Ros	36x6	40x6	Day	23	9000 186 80
Macdon AC5	5500	Cont B2	36.1	L	Bus	Fin	Fin	FS	Zen	G	Con	B-Li	DD	Eis	W	Shel	Flot	10.2	51.83	Ros	36x6	40x6	Day	23	9000 186 80
Master BL	5290	Buda ATU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Master FL	5290	Buda ATU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Master FL	5440	Buda ATU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Moreland J.	5440	Wis RAU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Moreland 21J	5000	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Nelson & LeMoon FC5	5000	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Old Reliable D.	5000	Oneida	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Oneida E9	5460	Oneida	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Packard EF	5500	Wis RAU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Packard M20	5700	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Pierces Arrow R10	5250	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Reynolds 10A	5550	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Rowe FW5	4975	Cont E4	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Sandow L	5100	Cont E4	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Sandow W50	5600	Buda YTU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Schmidt	4250	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Service 101	5300	Buda YU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Signal R	5250	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Standard 5K	5600	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Sterling 5-Worm	5300	Ster EU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Sterling 5-Chain	5600	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Super Truck 100	5300	Wis VAU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Tiffin	5400	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Traylor F	4700	Buda YTU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Trinity 4-W.H. Drive DA	5250	Buda YU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
United V 5	5000	Buda ATU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
U.S.T.	5600	Buda ATU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Ward La France 5A	5800	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
White 40	4500	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Wilson H	4500	Cont B2	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
Winther 109	5250	Wis VAU	36.1	L	Chic	Fin	PT	FS	Mas	V	Pier	B-Li	DD	Eis	W	W	Flot	11.6	56.43	Ros	36x6	40x6	Smi	23	9200 170 72
5 1/2, 6 and 7 Ton																									
Available H7	6000	Her T3	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	10300 190 75
Barlett 70	7350	Wis RBU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	11000 144 83
Beard 6	6000	Wau PU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	12000 144 83
Deane 150 A-7 1/2	6000	Buda BTU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	8500 178 79
Hall 7 Chain	6100	Cont E4	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	10200 162
Kelly-Springfield K60	5750	Buda YTU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	8400 Op 93
Macdonald A	5750	Cont B2	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	6000 Op 66
Macdon AC6	5750	Cont B2	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	8672 Op 73
Macdon AC7 1/2	6000	Wau AC	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	9050 Op 78
Old Reliable K. L. M.	6000	Wau AC	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	10240 136 78
Sterling 7 1/2-Chain	6500	Ster EU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	11000 174 94
Tiffin 6 U.W.	5600	Cont B2	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	9000 168 80
Union J.W.	5800	Wau AC	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	10000 183 75
Wichita S	5000	Beav JB	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	10000 165 80
Winther 140	5900	Wis RBU	40	L	Chic	Fin	PT	FS	Shelb	G	Sim	B-Li	DD	Bos	W	W	Flot	14	74.90	Ros	36x6	40x14	Smi	23	9600 162 80
Gasoline Tractor—Trucks																									
Federal Light Duty	3200	Cont C4	27.2	L	GO	Fin	PT	FS	Zen	G	Phar	B-B	DD	Eis	W	W	Flot	9.2	40.7	Gem	36x4	36x7	Way	23	4700 120
Federal Heavy Duty	4150	Cont E4	32.4	L	GO	Fin	PT	FS	Zen	G	Phar	B-B	DD	Eis	W	W	Flot	12	59.8	Gem	36x4	36x7	Way	23	4900 114
Fulton D	4150	Her	32.4	L	GO	Fin	PT	FS	Zen	G	Phar	B-B	DD	Eis	W	W	Flot	12	59.8	Gem	36x4	36x7	Way	23	3200 110 65
Kosher MT	3400	Spec 6	25.6	L	Spec	Fin	PT	FS	Zen	G	Phar	B-B	DD	Eis	W	W	Flot	9.25	37	Spe	36x4	36x7	Way	23	5000 129 75
Lombard 140H P	3400	Spec 6	25.6	L	Spec	Fin	PT	FS	Zen	G	Phar	B-B	DD	Eis	W	W</									

ELECTRIC COMMERCIAL CARS

E.C.M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
	Ward WS 2.....	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
	*C-T BR 1.....	1000	2000	2120	14	Opt	60	G-E	Own	4	C-T	Shel	Shel	36x3½	36x3½	W	89¼	60
	Walker M.....	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	94	68
	Atlantic 1C.....	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
	Ward WA.....	1250	2730	.....	12	Opt	45	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
	C-T BR 2.....	2000	2400	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	101	60
	C-T BR 2A.....	1500	2200	2200	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3½	W	91½	60
	Lansden BG ¾.....	.....	1400	.....	15	Opt	50	G-E	G-E	4	R	Flot	Shel	32x4½	32x4½	Lav	90	50
	Lansden MC 1.....	.....	2900	.....	12	Opt	50	G-E	G-E	4	C	Flot	.....	36x3	36x3½	.....	108	60
	Steinmetz.....	1000	1900	.....	16	Opt	55	Diehl	Own	4	B	Own	.....	33x4½	33x4½*	Ross	110	60
	Walker K.....	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
	Ward WB.....	2000	3430	.....	10	Opt	40	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
	Atlantic 2C.....	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3½	Ross	115	65
	C-T BR 4.....	4000	4000	2800	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4½	W	116	60
	Lansden MD 2.....	.....	4400	.....	11	Opt	50	G-E	G-E	4	C	Own	.....	36x4	36x3½	.....	120	60
	Walker L.....	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
	Ward WD.....	4000	4500	.....	8.5	Opt	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
	Atlantic 3C.....	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5½	Ross	135	65
	C-T AK 7.....	7000	5800	4200	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6	36x4½	W	122	55
	Lansden ME 3½.....	.....	5700	.....	10	Opt	45	G-E	G-E	4	C	Flot	.....	36x5	36x4½	.....	133	60
	Ward WF.....	7000	6600	.....	7	Opt	30	G-E	G-E	5	W	Shel	Shel	36x5	36x8	Own	132	70
	Atlantic 5C.....	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5½	Ross	144	65
	Couple Gear H.....	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55
	Couple Gear A.....	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	75
	C-T AK 10.....	10000	6500	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5½	W	132	55
	Lansden MT 5.....	.....	7500	.....	10	Opt	40	G-E	G-E	4	C	Flot	.....	36x6	36x5½	.....	146	60
	Lansden MG 6.....	.....	8900	.....	7	Opt	35	G-E	G-E	4	R	Flot	.....	36x7	36x6½	.....	156	60
	Walker P.....	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	40x5½	Ross	131	66
	Walker N.....	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	40x6½	Ross	141	66
	Ward WH.....	10000	8375	.....	6	Opt	26	G-E	G-E	5	W	Shel	Shel	36x7	40x10	Own	144	70
	Atlantic 6C.....	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
	Couple Gear LD.....	14000	11000	5900	10	Phil	30	Own	Own	5	R	Own	Tut	36x6	36x8	Own	96	55

Manufacturers and Models Included in Specifications on Preceding Pages

Acason—¾, 1, 1½, 2½, 3½, 5—Acason Motor Truck Co., Detroit Mich.
 Ace—1½, 2½—American Motor Truck Co., Newark, Ohio.
 Acme—¾, 1, 1½, 2, 2½, 3½, 5—Acme Motor Truck Co., Cadillac, Mich.
 Ajax—3½—Ajax Motors Corp., Boston, Mass.
 Akron Multi-Truck—1—Thomart Motor Truck Co., Akron, Ohio.
 American—2½, 4—American Motor Truck & Tractor Co., Portland, Conn.
 Apex—1, 1½, 2½, 3½—Hamilton Motor Co., Grand Haven, Mich.
 Armleder—1, 2½, 3½—O. Armleder Co., Cincinnati, Ohio.
 Atco—1½, 2½—American Truck & Trailer Corp., Kankakee, Ill.
 Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.
 Atlas—1—Atlas Truck Corp., York, Pa.
 Atterbury—1½, 2½, 3½, 5—Atterbury Motor Car Co., Buffalo, N. Y.
 Autocar—2, 3½, 5½—Autocar Co., Ardmore, Pa.
 Available—1½, 2, 2½, 3½, 5, 7—Available Truck Co., Chicago, Ill.
 Avery—1—Avery Company, Peoria, Ill.
 Bartlett—7—Bartlett Truck Co., Chicago, Ill.
 Beck-Hawkeye—1, 1½, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
 Bell—1, 1½, 2½—Iowa Motor Truck Co., Ottumwa, Ia.
 Belmont—1, 1½, 2, 3½—Belmont Motors Corp., Lewistown, Pa.
 Bessemer—1, 1½, 2½, 4—Bessemer Motor Truck Co., Grove City, Pa.
 Bethlehem—1, 2, 3, 4—Bethlehem Motor Truck Corp., Allentown, Pa.
 Birch—1—Birch Motor Cars, Chicago, Ill.
 Bowman—¾—Bowman Motor Car Co., Covington, Ky.
 Bridgeport—1½, 2½, 3½—Bridgeport Motor Truck Co., Bridgeport, Conn.
 Brinton—2½—Brinton Motor Truck Co., Philadelphia, Pa.
 Briscoe—1—Briscoe Motor Corp., Jackson, Mich.
 Brockway—¾, 1½, 2½, 3½, 5—Brockway Motor Truck Co., Cortland, N. Y.
 C. T.—1, 1½, 2, 3½, 5—Commercial Truck Co., Philadelphia, Pa.
 Capitol—1½, 2½, 3½—Capitol Motors Corp., Fall River, Mass.
 Case—2—J. I. Case Plow Works Co., Racine, Wis.
 Chevrolet—¾, 1—Chevrolet Motor Co. of Mich., Flint, Mich.
 Chicago—1½, 2½, 3½, 5—Chicago Motor Truck, Inc., Chicago, Ill.
 Climber—1½—Climber Motor Corp., Little Rock, Ark.
 Clydesdale—¾, 1, 1½, 2½, 3½, 5—Clydesdale Motor Truck Co., Clyde, Ohio.
 Collier—1, 1½, 2, 2½—Collier Motor Truck Co., Bellevue, Ohio.
 Columbia—1½, 2½—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
 Commerce—1½, 1½, 2—Commerce Motor Car Co., Detroit, Mich.
 Concord—1½, 2½—Abbott-Downing Truck & Body Co., Concord, N. H.
 Corbitt—1, 1½, 2, 2½, 3½, 5—Corbitt Motor Truck Co., Henderson, N. C.
 Couple Gear—3½, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.
 Cyclone—1½—The Cyclone Motor Corp., Greenville, S. C.
 Dart—1½, 2½, 3½—Dart Truck & Tractor Corp., Waterloo, Ia.
 Day-Elder—1, 1½, 2, 2½, 3½, 5—Day-Elder Motors Corp., Newark, N. J.
 Dearborn—1, 1½, 2—Dearborn Truck Co., Chicago, Ill.
 Defiance—1, 1½, 2—Defiance Motor Truck Co., Defiance, Ohio.
 Denby—1, 1½, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.
 Dependable—1, 1½, 2, 2½, 3½—Dependable Truck & Tractor Co., East St. Louis, Ill.
 Diamond T—1½, 1½, 2, 3½, 5—Diamond T Motor Car Co., Chicago, Ill.
 Diehl—1, 1½—Diehl Motor Truck Works, Philadelphia, Pa.
 Doane—2½, 3½, 6—Doane Motor Truck Co., San Francisco, Cal.
 Dodge—1½—Dodge Bros., Detroit, Mich.
 D-Olt—1½—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.
 Dorris—2, 3½—Dorris Motor Car Co., St. Louis, Mo.

Double Drive—4—Double Drive Truck Co., Chicago, Ill.
 Douglas—1½, 2, 3—Douglas Motors Corp., Omaha, Neb.
 Duplex—2, 3½—Duplex Truck Co., Lansing, Mich.
 Duty—2—Duty Motor Co., Greenville, Ill.
 Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.
 Erie—2½—Erie Motor Truck Mfg. Co., Erie, Pa.
 F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.
 Facto—2½—Facto Motor Trucks, Springfield, Mass.
 Fageol—1½, 2½, 3½, 5—Fageol Motors Co., Oakland, Cal.
 Fargo—2—Fargo Motor Truck Co., Chicago, Ill.
 Federal—1, 1½, 2, 3½, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.
 Ford—1—Ford Motor Co., Highland Park, Mich.
 Forschler—1, 1½, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.
 Front Drive—1½—Double Drive Truck Co., Chicago, Ill.
 Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.
 G. M. C.—¾, 1, 2, 3½, 5—General Motors Truck Co., Pontiac, Mich.
 G. W. W.—1½—Wilson Truck Mfg. Co., Henderson, Ia.
 Garford—¾, 1½, 2, 3½, 5, 7½—Garford Motor Truck Co., Lima, O.
 Gary—1½, 2½, 3½, 5—Gary Motor Truck Co., Gary, Ind.
 Gersix—1½, 2½, 3—Gersix Mfg. Co., Seattle, Wash.
 Giant—1½, 2½, 3½, 5—Giant Truck Corp., Chicago Heights, Ill.
 Globe—¾—Globe Motors Co., Cleveland, Ohio.
 Gove—2½—Gove Motor Car Co., Detroit, Mich.
 Graham—1½—Graham Brothers, Evansville, Ind.
 Gramm-Bernstein—1, 1½, 2, 2½, 3, 3½, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
 Hahn—1, 1½, 2, 2½, 3½, 5—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
 Hal-Fur—2, 3½—Hal-Fur Motor Truck Co., Cleveland, Ohio.
 Hall—2½, 3½, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.
 Harvey—1½, 2½, 3½, 5—Harvey Motor Truck Co., Harvey, Ill.
 Hawkeye—1½, 2, 3½—Hawkeye Truck Co., Sioux City, Ia.
 Hendrickson—2½, 3½, 5—Hendrickson Motor Truck Co., Chicago, Ill.
 Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.
 Higrade—1, 1½—Higrade Motors Co., Harbor Springs, Mich.
 Holmes—2—Holmes Motors Mfg. Co., Littleton, Colo.
 H. R. L.—¾, 1½, 2½—H. R. L. Motor Co., Seattle, Wash.
 Huffman—1½—Huffman Bros. Co., Elkhart, Ind.
 Hurlburt—1½, 2½, 3½, 5—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.
 Huron—1½, 2½—Huron Truck Co., Bad Axe, Mich.
 Independent—1½, 2½, 3½—Independent Motor Co., Youngstown, Ohio.
 Independent—1½, 2½—Independent Motor Truck Co., Inc., Davenport, Ia.
 Indiana—1½, 2, 2½, 3½, 5—Indiana Truck Corp., Marion, Ind.
 International—1, 1½, 2, 3, 5—International Harvester Co., Chicago, Ill.
 Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.
 Jackson—3½—Jackson Motors Corp., Jackson, Mich.
 J & J—2—The Lorain Motor Truck Co., Lorain, Ohio.
 Jumbo—1½, 2, 2½, 3, 3½, 4—Nelson Motor Truck Co., Saginaw, Mich.
 Kalamazoo—1½, 2½, 3½—Kalamazoo Motor Corp., Kalamazoo, Mich.
 Kankakee—2½—Kankakee Automobile Co., Kankakee, Ill.
 Karavan—2½—Caravan Motors Co., Portland, Ore.
 Kearns—¾, 1½—Kearns-Dughe Motors Co., Danville, Pa.
 Kelly-Springfield—1½, 2½, 3½, 5, 6—Hare's Motors, Inc., New York, N. Y.
 Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.
 Kimball—2, 2½, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.
 King Zeitler—2, 4—King Zeitler Co., Chicago, Ill.
 Kissel—1, 1½, 2½, 4, 5—Kissel Motor Car Co., Hartford, Wis.
 Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.

- Koehler—1½, 2½, 3½, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.
- Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.
- Lansden—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.
- Larrabee-Deyo—1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
- L. M. C.—2½—Louisiana Motor Car Co., Shreveport, La.
- Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
- Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
- Luverne—2, 3—Luverne Automobile Co., Luverne, Minn.
- Maccar—1½, 2½, 3½, 5—Maccar Truck Co., Scranton, Pa.
- MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.
- Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.
- Master—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
- Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
- Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.
- Moline—1½—Moline Plow Co., Moline, Ill.
- Moreland—1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.
- Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.
- Napoleon—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.
- Nash—1, 2—Nash Motors Co., Kenosha, Wis.
- Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
- Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
- Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.
- Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
- Northway—2, 3½—Northway Motors Co., Natick, Mass.
- Norwalk—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.
- O. K.—1½, 2½, 3½—Oklaoma Auto Mfg. Co., North Muskogee, Okla.
- Ogden—1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.
- Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.
- Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
- Oldsmobile—1—Olds Motor Works, Lansing, Mich.
- Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
- Oneida—1½, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
- Orleans—1½, 2½, 3½—New Orleans Motor Truck Mfg. Co., New Orleans, La.
- Oshkosh—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
- Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.
- Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
- Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
- Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.
- Penn—2—Penn Motor Corp., Philadelphia, Pa.
- Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
- Pioneer—1—Pioneer Truck Co., Chicago, Ill.
- Pittsburgher—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
- Power—1½, 3½—Power Truck & Tractor Co., Detroit, Mich.
- Premocar—1½—Preston Motors Corp., Birmingham, Ala.
- Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.
- Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.
- Reliance—1½, 2½—Reliance Motor Truck Co., Appleton, Wis.
- Reo—1½—Reo Motor Car Co., Lansing, Mich.
- Republic—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
- Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.
- Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.
- Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
- Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
- Samson—¾, 1½—Samson Tractor Co., Janesville, Wis.
- Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.
- Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
- Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
- Schwartz—1, 1½, 2½, 4—Schwartz Motor Truck Co., Reading, Pa.
- Selden—1½, 2½, 3½, 5—Selden Truck Corp., Rochester, N. Y.
- Seneca—1½—Seneca Motor Car Co., Fostoria, Ohio.
- Service—¾, 1, 1½, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.
- Signal—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.
- Southern—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.
- Standard—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
- Steinmetz—¾—Steinmetz Electric Motor Car Corp., Baltimore, Md.
- Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
- Stewart—¾, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
- Stoughton—1, 1½, 2, 3—Stoughton Wagon Co., Stoughton, Wis.
- Success—2½—Webberville Truck Co., Webberville, Mich.
- Super Truck—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.
- Superior—1, 2—Superior Motor Truck Co., Atlanta, Ga.
- Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
- Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.
- Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
- Trabold—2½—The Trabold Company, Johnstown, Pa.
- Traffic—2—Traffic Motor Truck Corp., St. Louis, Mo.
- Transport—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.
- Traylor—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
- Triangle—¾, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
- Triumph—2, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.
- Twin City—F. W. D., 3½, 5—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.
- Twin City—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
- Ultimate—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.
- Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.
- United—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.
- Ursus—1, 1½, 2½—Ursus Motor Co., Inc., Chicago, Ill.
- U. S.—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
- Velie—1½—Velie Motors Corp., Moline, Ill.
- Vim—1½, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.
- Vulcan—2½—Vulcan Mfg. Co., Seattle, Wash.
- Walker—1½, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
- Walker-Johnson—2½—Walker-Johnson Truck Co., Woburn, Mass.
- Walter—5—Walter Motor Truck Co., New York, N. Y.
- Ward—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
- Ward La France—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.
- Watson—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.
- White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
- White Hickory—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.
- Wichita—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
- Wilcox—1, 1½, 2½, 3½, 5—H. E. Wilcox Motor Co., Minneapolis, Minn.
- Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
- Winther—1, 1½, 2, 2½, 3½, 5, 6—Winther Motor Truck Co., Kenosha, Wis.
- Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.
- Wolverine—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.
- Yellow Cab—¾, 1—Yellow Cab Mfg. Co., Chicago, Ill.
- Young—1, 2, 3½—The Young Motor Truck Co., Euclid, Ohio.

Truck is a Portable Motor Car Supply Store

In order to stimulate business and at the same time assure its customers prompter deliveries, the Malton Specialty Co., of Boston, is now employing a motor truck fitted with a special body for the purpose of carrying motor car parts and accessories. The body is made of Vehisote, and complete with shelves and drawers weighs 1100 lb. This company finds that an outfit of this character is both a business builder as well as a good advertising medium.

The truck starts out on Monday morning and stays on the road until Saturday afternoon. The vehicle covers a radius of 150 miles from Boston. An inventory of the parts carried is made once a month. Triplicate bills are made out, the first going to the customer, the second to the home office and the third is retained by the truck operator.

The interior of the body is lined with bins and drawers. Every bin and drawer is labeled with an actual part.



Traveling Warehouse Used by the Malton Specialty Co., Which Takes the Goods Direct to the Dealer, or Repair Shop, as the Case May be

American Forge Company Enters Automotive Field on Big Scale

WITH the distinction of having the only plant of its kind in the United States, the American Forge Company has started operations at its new shops in Chicago and will take its place as one of the companies purveying to the automotive industry. The company will do upsetting only in the new plant, turning out all manner of forged pieces by this process for use in the manufacture of cars, trucks and tractors. The process is claimed to so rearrange the fibres of the steel during the upsetting and forging process, that its strength is increased very materially and this extra strength is of particular value in the manufacture of gear blanks for transmissions, etc.

The plant is modern in every way, of steel, brick and concrete construction throughout and is so arranged that every economy known to modern factory management may be taken advantage of.

The main building is 460 ft. long by 80 ft. wide. In this building the upsetting equipment consists of six seven-inch machines, one six-inch machine, six five-inch machines and four three-inch machines.

Oil furnaces are used in heating the metal.

Number two building is used for shipping, and is 60 ft. x 200 ft. Shipping tracks are depressed so that car floors are on a level with the floor of the shops.

The heat treating is done in building No. 3, which is 60 ft. x 100 ft. Four Tate-Jones double-end car type heat-treating furnaces are the present equipment of this plant.

Building No. 4 is the hammer shop, 40 ft. x 60 ft. and the boiled room, in Building No. 5 is 40 ft. x 40 ft.

The stock yard is traversed its entire length by a five-ton gantry crane, and stock may be delivered either from cars or stock piles directly to the yard scales and thence to electric trucks which lift the piled stock and deliver it at each machine without waste of effort or rehandling. A five-ton crane running the length of the main upsetting shop handles stock inside.

The American Forge Company was organized July 1, 1920, as an offshoot from the Ajax Forge Co., of Chicago, and Ajax machines are used throughout. Operations were started May 2 of this year. The officers of the company are as follows:

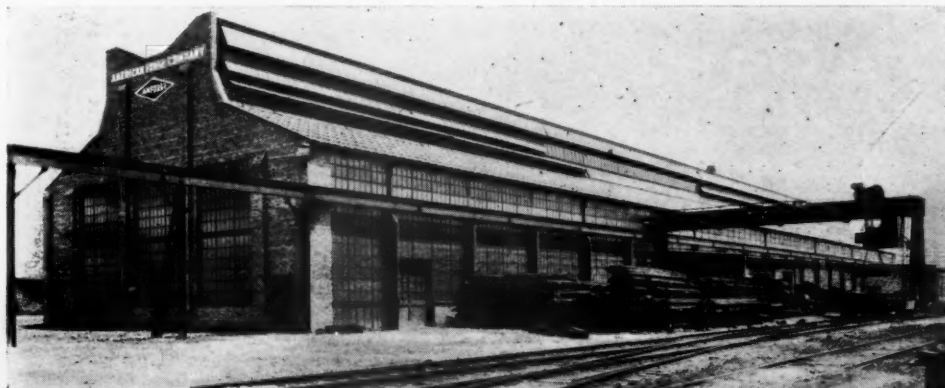
President and secretary, R. Ortman; vice-presidents, George F. Artsinger and William E. Crocombe; secretary, George C. Ames. William J. Todhunter is superintendent in charge of manufacturing.

Failures Are Decreasing

An encouraging note is found in the preliminary returns to R. G. Dun & Co., disclosing 4,133 commercial failures in the U. S. during the second quarter of 1921, with liabilities of \$127,621,553 and 9,005 defaults, supplying \$308,019,542 for the half year. In comparison with the first half of 1921, there are 739 less insolvencies and the indebtedness some \$32,775,000 less. Except for April, failures have been decreasing with each month. Total for June 1, 290, is smallest for any month since last November.

Goodyear Has Excellent Improvement Policy

The Goodyear Tire & Rubber Co., of Akron, is getting remarkable results from a policy of rewarding suggestions for improvements in manufacturing methods and machinery, which has been in operation for nine years. In this time 55,000 new ideas have been submitted by employees, and 2,700 accepted. For some of this as high as \$200 have been paid, the usual award being \$10 to \$50.



General Views of the New Plant of the American Forge Co., Chicago, Illinois

Above: Main building and stock yard. Left: Stock yard, showing scales, electric truck and gantry crane. Right: Interior of the main building, showing upsetting machines

Milk Shipped in Glass-Lined Thermos Tanks Mounted on Trucks and Trailers

By CHARLES W. GEIGER

GLASS-LINED thermos tanks mounted on Pierce-Arrow trucks and Reliance trailers are now being used by the United Milk Co., San Francisco, Cal., in hauling milk from Soledad to San Francisco, a distance of 134 miles. Previous to the use of these thermos tanks, the milk was hauled in ten-gallon tanks, which were carried by trucks and trailers. While the use of trucks and trailers in hauling the ten-gallon tanks was far superior to the former method of shipping the milk by rail, it was not an entire success. As a result the glass-lined steel thermos tanks were built especially for this purpose, two of them being installed on Pierce-Arrow trucks and three on Reliance trailers.

The special bodies which had been used in hauling the ten-gallon tanks were removed from the trucks and trailers, and the 1500 gallon glass-lined tanks mounted on bolsters and bolted to the chassis in a manner similar to oil tanks.

The United Milk Co. has installed a cooling plant at Soledad, where the milk is received from twenty ranches and brought to a temperature of 34 to 36 degrees. The milk is brought in from these ranches by means of two 2 ton White trucks and one Ford. Each truck has a capacity for hauling 60 ten-gallon milk tanks. These trucks start picking up the cans at 7 o'clock in the morning, and is delivered to the cooling plant at 10 o'clock A. M. At 6 o'clock that evening the three trucks start picking up the P. M. milk, and arrive at the cooling plant at 10 o'clock P. M. After being weighed the milk is delivered into the receiving tank, and from this tank is pumped over the cooler, which is elevated so as to permit the cooled milk to gravitate into the 1500 gallon glass-lined tanks for delivery to San Francisco. It requires about 90 minutes to fill the 1500 gallon tank at the cooling plant.

In order to keep the milk at a low temperature during the trip to San Fran-

cisco the glass-lined tanks have been insulated by covering them with a layer of felt packing three inches thick. After wrapping the felt with wire, it is covered with water-proof roofing material. In order to completely protect the insulation the felt packing is enclosed in a galvanized iron jacket.

In order to give access to the glass-lined tanks, a 20 inch man-hole is placed at the top of each tank. Through this opening workmen may enter the tank for cleaning purposes. Immediately after being emptied, each tank is given a thorough cleaning by a workman who enters the tank, wearing rubber boots so as to protect the glass lining of the tank. A soda solution is used in washing the interior of the tank, after which it is hosed down with hot water. Then a head of live steam is turned into the tank, and after a half hour the tank is cleaned, and the man-hole clamped down, and the tank is ready to receive another shipment of milk.

The Pierce-Arrow trucks on which two of the tanks are mounted are 5 ton trucks, each carrying a 65 gallon reserve tank of gasoline on the right side. This is connected with the running tank by means of a one-inch pipe, through which fuel may be delivered by simply turning a valve.

The three Reliance trailers on which the tanks are mounted are of 7½ tons capacity. These trailers have been cut down so as to bring the center of gravity as low as possible to eliminate any danger of the trailer turning over. In addition to lowering the trailer, the tread was widened by 9 inches for greater stabilization.

The trailers are equipped with external contracting brakes. The San Juan grade is negotiated on compression. This grade is about five miles long and has a maximum grade of 12 per cent and an average of 7 per cent.



Milk Train Going Over the San Juan Grade

Oldfield Tire Co., Akron, O.	25.75	47.45	50.20	53.65	56.05	66.85	70.15	93.70	2200	90	130.80	3000	100	168.50	4000	110
Oldfield Cord, anti-skid	25.75	47.45	50.20	53.65	56.05	66.85	70.15	93.70	2200	90	130.80	3000	100	168.50	4000	110
Pennsylvania Rubber Co., Jeannette, Pa.	29.65	41.85	44.25	47.35	49.65	58.95	60.80	85.55	2200	90	125.95	3000	100	159.35	4000	110
Vacuum Cup, Cord	24.70	46.30	48.95	52.35	54.90	65.20	68.45	113.10	2200	90	159.90	3000	100	205.20	4000	110
Perfection Tire & Rubber Co., Fort Madison, Ia.	24.90	41.85	44.25	47.30	49.65	58.90	61.90	102.65	2200	90	140.00	3000	100	186.00	4000	110
Perfection Cord, non-skid	24.90	41.85	44.25	47.30	49.65	58.90	61.90	102.65	2200	90	140.00	3000	100	186.00	4000	110
Pharis Tire & Rubber Co., Newark, O.	29.50	46.00	48.50	52.00	54.50	64.00	66.50	102.65	2200	90	140.00	3000	100	186.00	4000	110
Quaker City Rubber Co., Philadelphia, Pa.	26.50	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110
T. T. T., Cord	25.70	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110
Racine Auto Tire Co., Racine, Wis.	25.70	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110
Horseshoe Cord, non-skid	25.70	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110
Racine Rubber Co., Racine, Wis.	25.70	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110
Republic Rubber Co., Youngstown, O.	25.90	43.50	46.00	49.20	51.60	61.25	64.35	95.50	2200	90	135.00	3000	100	186.00	4000	110
Republic Rubber Co., Youngstown, O.	25.90	43.50	46.00	49.20	51.60	61.25	64.35	95.50	2200	90	135.00	3000	100	186.00	4000	110
Standard Tire Co., Willoughby, O.	28.00	46.20	49.00	53.00	55.00	65.50	68.50	108.00	2200	90	143.00	3000	100	186.00	4000	110
Tiger Foot, non-skid	24.50	46.60	49.30	52.70	55.25	65.60	67.00	92.00	2200	90	128.50	3000	100	186.00	4000	110
Star Rubber Co., Akron, O.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Star Cord, All Star	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Meteor Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Swinehart Tire & Rubber Co., Akron, O.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Swinehart Cord, Hexagon	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Syracuse Rubber Co., Inc., Syracuse, N. Y.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Syracuse Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Tyr Rubber Co., Andover, Mass.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
Tyrian Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
United States Tire Co., New York, N. Y.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110
U. S. Nobby Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	110.40	2200	90	156.15	3000	100	201.15	4000	110

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Brand Name and Makers' List

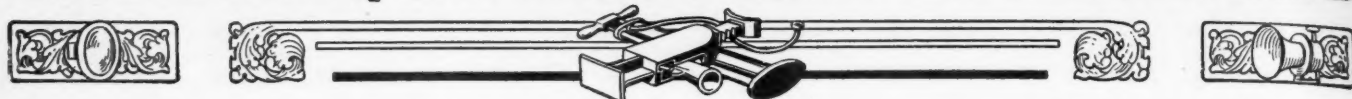
Allen—Allen Motor Co., Columbus, O.
 A. S. V.—American Sleeve Valve Co., New York City, N. Y.
 Beaver—Beaver Mfg. Co., Milwaukee, Wis.
 B. M. C.—Bethlehem Motors Corp., Pottstown, Pa.
 Brennan—Brennan Motor Mfg. Co., Syracuse, N. Y.
 Buda—Buda Co., Harvey, Ill.
 Buffalo—Buffalo Gasoline Motor Co., Buffalo, N. Y.
 Continental—Continental Motors Corp., Detroit, Mich.
 Erd—Erd Motor Co., Saginaw, Mich.
 Falls—Falls Motors Corp., Sheboygan Falls, Wis.
 G., B. & S.—Golden, Belknap & Swartz Co., Detroit, Mich.
 Gray—Beall—Gray Motor Co., Detroit, Mich.
 Hercules—Hercules Motor Mfg. Co., Canton, O.
 Herschell—Spillman—Herschell-Spillman Motor Co., Tonawanda, N. Y.
 Highway—Highway Engine Co., Defiance, O.
 Hinkley—Hinkley Motors Corp., Detroit, Mich.
 Le Rol—Le Rol Co., Milwaukee, Wis.
 Light—Light Mfg. & Fdy. and Machine Co., Pottstown, Pa.
 Locoming—Locoming Fdy. and Machine Co., Williamsport, Pa.
 Matthews—Matthews Engineering Co., Sandusky, O.
 Midwest—Midwest Engine Co., Indianapolis, Ind.
 Minerva—Minerva Engine Co., Cleveland, O.
 R. & V.—R. & V. Motor Co., East Moline, Ill.
 Stearns—Stearns Motor Mfg. Co., Ludington, Mich.
 Supreme—Supreme Motor Corp., Warren, O.
 Turno—Turner & Moore Mfg. Co., Detroit, Mich.
 Twin City—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
 Waukesha—Waukesha Motor Co., Waukesha, Wis.
 Weidely—Weidely Motors Co., Indianapolis, Ind.
 Wisconsin—Wisconsin Motor Mfg. Co., Milwaukee, Wis.

Abbreviations Used in Above Table

In all specifications Q-Optional			
Valve Arrangement	Carburetor Location	Crankcase (Material)	Connecting Rod Bearing
H—Head	C—Center	A—Aluminum	V—Varied
L—Ell—Head	L—Left	C—Cast Iron	
S—Sleeve	R—Right	½—Semi Steel	
Camshaft Location	Pump Location	Crankcase (How Cast)	Mainbearings (Diameter)
B—Rear	F—Front	C—Cylinder	V—Varied
L—Left	L—Left	S—Separate	
R—Right	R—Right		
Camshaft Drive	Generator Location	Lubrication	Carburetor (Make)
C—Chain	L—Left	B—Both	S—Stromberg
H—Helical Gear	R—Right	F—Force	Z—Zenith
L—Spiral Gear		S—Splash	
S—Spur Gear			
Piston (Material)	Starter Location	Camshaft (Diameter)	Connecting Rod Bearing
AC—Aluminum & Cast Iron	L—Left	V—Varied	V—Varied
C—Cast Iron	R—Right		
G—Gray Iron			
½—Semi Steel			
Piston Pin (Bushing Type)	Distributor or Magneto Location		
C—Connecting Rod	B—Rear		
F—Floating	F—Front		
P—Plating	L—Left		
	R—Right		

6 Cylinder Engines

TRUCK EQUIPMENT AND APPLIANCES



New Battery Ignition System Announced by Bosch

In keeping with the declared policy of the American Bosch Magneto Corp., Springfield, Mass., to satisfy every electro-mechanical need of the automotive industry, a new battery ignition system has been placed on the market. The fact that the Bosch name of quality and dependability is linked up with the new product presages wide interest and attention for it in automotive circles.

The Bosch Co. in the designing of its ignition battery system has successfully endeavored to build the finest mechanism of its kind. Many new features of construction and theory, most important of which is the so-called compensating feature, are incorporated in it.

The Bosch Timer-Distributor and the Bosch Coil make up the Battery Ignition System. Two types of Bosch Timer-Distributors are available—types "T" and "TM." Type "TM" is identical in general detail with Type "T" but differs in that the Compensating feature is not included, and the "advance" is subject to the customary manual control. Both systems use the jump spark method of current distribution, and are provided for 4, 6, 8 cylinder engines.

Each outfit consists of five distinct units: Main Housing, Interrupter Cup, Compensating feature, Distributor, Ignition Coil.

The Main Housing or Shell, the lower end of which also constitutes the bearing for the timer shaft, is a soft gray iron casting, carefully machined to receive the interrupter cup which rests in the upper section.

Spring clips, of an advanced design, hold the distributor cap in place, and

permit quick and easy inspection of the distributor, interrupter and condenser.

Ventilation of the interrupting and distributing mechanism is very ingeniously accomplished by fastening the spring clips with the tubular rivets.

The Timing arm for manual advancement or retardation of the spark is a one-piece drop forging and is mounted on a shoulder at the base of the main housing in both systems. It may be clamped in any angular position desired.

When used in connection with the Compensating feature, this manual control may readily supplement the automatic control.

Lubrication of the bearing and governor parts in the Compensating system is accomplished by means of a simple but efficient "splash system." Shaft bearings are lubricated by capillary action through a wick felt leading from the sump to the shaft.

The interrupter is assembled in a cup which also contains a condenser. The whole unit, therefore, can be easily removed for inspection without disturbing any of its component parts or electrical connections.

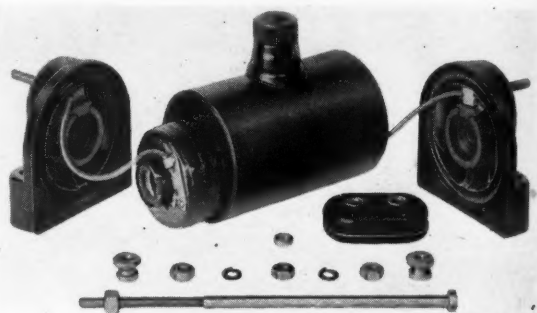
The low tension terminal, externally connecting the primary of the coil, is carried by the cup itself. The interrupter cup is seated on a ledge so as to securely maintain interrupter lever in proper vertical relation to cam. Assembled, cup slightly projects above main housing.

The interrupter lever is made from a one-piece steel stamping, copper and nickel plated. Its construction is such as to provide a very light but strong and

rigid lever, and the spring tension required for its operation need be but very slight.

The interrupter is provided with a tinned copper shunt which, because of its lower electrical resistance, carries practically all the current, thereby obviating all possible detrimental effects upon the interrupter lever spring.

The condenser is of the dry-wound type, totally enclosed and sealed in a moisture-proof metal housing. It is located in the interrupter cup, and connected directly across the contact points of the interrupter, where it is enabled to perform effective and continuous service.



Bosch Coil Dismantled

Though easily taken apart, it is stated to have positive electrical connections

The governor is of the "tilting ring" type, and together with the interrupter cam and rotor is carried on the timer shaft. The range of ignition advance is determined by an advance control stud integral with the governor mechanism.

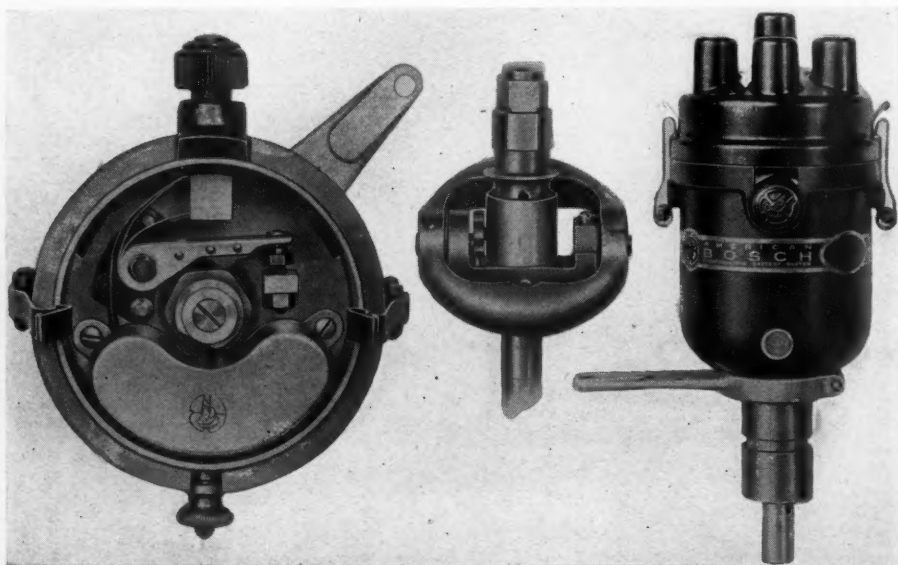
As the timer shaft rotates, the resultant tilting movement of the governor ring, due to centrifugal force, advances the interrupter cam, which is assembled to the timer shaft in the form of a sleeve, by direct engagement of a stud projecting into a slot provided in this sleeve. The total throw of the governor ring is adjustable by means of stop pins.

To provide the proper movement of the cam at different engine speed, the tilting of the ring is opposed by an adjustable spirally wound spring located in a recess in the bearing hub of the ring.

This spring has not only been made adjustable with relation to the ring for varying the initial tension of the spring, and thereby controlling the speed at which the advance mechanism becomes operative, but various springs of different tension may be provided so that the required advance may be selected and assembled to the unit according to the engine characteristics.

For the same general shape of characteristic curve, that is, the same percentage of movement at definite speeds, a total advance may be secured from 0° to 60 deg. or even more, measured on the engine flywheel.

The governor may be adjusted to start the advance as low as 300 engine r.p.m. or



Left: Contact Breaker; the Entire Mechanism Sets in a Removable Cup. Center: Governor, Operating Crank-Pin at the Left. Right: Timer-Distributor, Having Compensative Feature

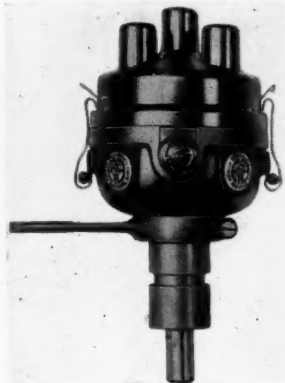
as high as may be desired. The travel may be completed at any speed required.

The means by which these adjustments are made may be detailed as follows:

- (a)—Travel of the ring is adjustable by low and high speed limit stops.
- (b)—Spring stiffness.
- (c)—The initial setting of the spring.
- (d)—The radius of the crank pin movement.

The rotor, which is mounted on a projection of the cam proper, and rotates with it, is provided with a skirt to protect the breaker mechanism. The rotor electrode is fastened by a screw into a recess on top of the rotor, and is, therefore, removable. As it rotates with the cam, it serves to conduct selectively high-tension currents through the corresponding distributor electrodes and cables to the proper spark plugs in the engine.

The distributor cap is mounted on top of the main housing, and is brought into alignment with the camshaft by a slight projection of the interrupter cup over



Bosch Manually Controlled Timer-Distributor

which it fits. A moulded-in tongue fits into a slight recess in the housing, which prevents incorrect assembly. The distributor will not break easily, is waterproof, and as the upper outside surface inclines at a proper angle, it sheds water very readily.

The towers for the high-tension cables are of sufficient height to eliminate short circuits and any external creepage of the high-tension current. The high-tension cable connections of the distributor cap are unusually simple, and ease of attaching cables is a special feature.

The ignition coil is of the dry-assembly type, as distinguished from coils which are sealed with insulating compounds. Its construction permits the accessibility of all parts.

The core is laminated, and of improved construction in that it permits the insertion of the center bolt holding the different units together without in any way disturbing the core itself.

The magnetic circuit is of a new and improved design in that the soft iron band plus the soft iron end plates establish a shield for the magnetic circuit against the weakening effect of neighboring bodies of iron or steel and materially increases the spark energy.

The primary and secondary connections are so designed that they are absolutely reliable, making a perfect connection under the most severe conditions, in spite of the fact that the different units of the

coil can be readily assembled and disassembled with a screw-driver, and that all low-tension connections are soldered. The high-tension cable terminal mounted in the center of the tubular casing surrounding the coil, and can be adjusted to any angular position by loosening the center bolt and swinging this casing to the position desired.

The Ballast coil or resistance unit, is electrically connected in series with the primary winding. It is employed for the usual purpose of protecting the coil from burning out and the storage battery from excessive discharge in case the engine is left with the battery switch in the "on" position with the interrupter contacts closed. It is also the means of producing a more uniform spark at different engine speeds. The entire ballast coil is a removable unit.

Manley One-Man Truck Wheel Dolly

An item of equipment that will handle the complete range of service work on all sizes, types and weights of truck wheels was recently brought out by the Manley Manufacturing Co., York, Pa. In designing the Manley Dolly, by which name this device is known, every condition that such a device would be called upon to meet was taken into consideration and provided for.

The designers had discovered early in the designing of this product, of the impracticability of lifting a truck wheel from the top, as most truck bodies project over the wheels. Also, that any design involving a frame or other obstruction in front of the truck wheel, preventing a clear view for sighting when the axle is in the center to easily relocate the wheel, would be practically worthless. It was finally decided that the device should be one that would pick the wheel up from the floor and lower it to the floor without the use of a crane chain block or hoist.

The construction of the Manley Dolly is simple. It consists of a longitudinal frame which is composed of two steel angles, forming a U section securely tied together by the various cross pieces easily seen in the accompanying illustration. The Dolly is supported on four roller bearing castings. The two block casters are between the two angles; and the two steel outrigs, which are securely bolted to the back frame and in addition have a truss rod, for stiffness, support the front casters.

The holders are pivoted to the outrigs and back frame as shown, the hood rods sliding in proper castings on the top. The forks, which are high-grade steel castings, are thoroughly braced and ribbed for strength. The outward thrust of the forks is taken by rollers, supported and rolling on rigidly braced uprights. The inward thrust of the forks is also taken by rollers bearing against the front side of the uprights.

The raising and lowering screw is 1 1/4 in. steel, and threads into a nut on the forks. On top of the screw is the bevel gear and under this the ball bearings thrust which takes the total weight of the wheel. This bearing rests on a bracket which also carries the bevel pinion to which the operating handle is secured.

The overall height of this device is 24 in.; width, 44 in.; depth, 37 in.; and weight, 250 lb.

The Manley Dolly is claimed to provide a one-man, no-effort method of handling any size truck wheel under all conditions, with entire safety. After the truck itself has been jacked up, the projecting forks of the Dolly are lowered until they pass under the wheel. The crank handle is then turned until the weight of the wheel rests on these forks, and the Dolly with its load may then be pulled out. To replace the wheel on the spindle these actions are reversed.

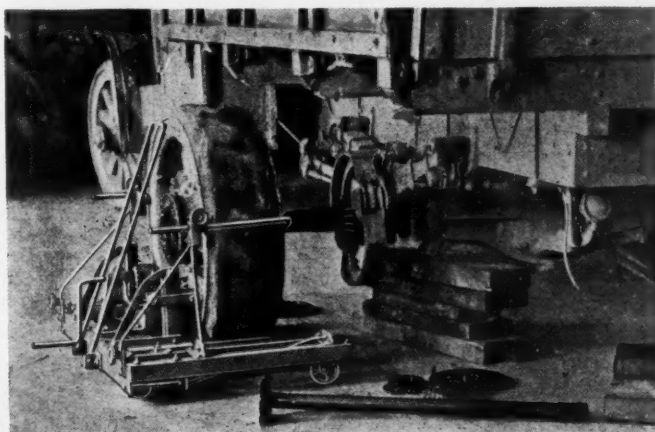
Another feature is that the spread of the forks is such that when they are lowered to the floor they clear the tire of the wheel. When the crank handle is turned they are raised, elevating the wheel from the floor which then rests on the forks. In this manner a wheel may be direct from the floor and the four casters on the Dolly permit the operator to convey the wheel with ease to any location desired. The vertical movement of the forks is 5 in., which is ample range for all purposes.

The spread of the forks are wide enough to clear the tire of the wheel 48 in. in diameter, and the holder hooks are wide enough and the forks project far enough to properly hold a wheel which has a 16 in. face. The supporting capacity is one ton, which can be easily raised by one man because of the efficient leverage.

Another point taken into consideration in the designing of this device was the proper locating of the operating crank. It is so located that when the workman is raising the wheel to locate it in line with the spindle, his position is exactly right.

Manley Truck Wheel Dolly in a Shop

Removing wheel and old tire from spindle



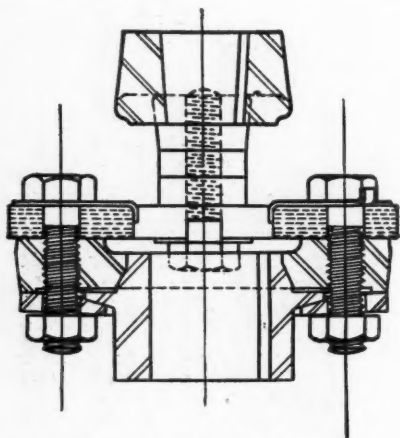
M. & E. Magneto Couplings and Universal Joints

The Merchant & Evans Co., Phila., Pa., has included two new products to its extensive line. They are universal joints known as "Griptite" and fabric magneto couplings.

The couplings are made in two types, viz: "Fixed Angle Type" and "Adjustable Angle Type."

The non-adjustable or fixed angle type coupling is of conventional design consisting of a 2¾ in. diam. fabric disk to which are bolted two-armed spider forgings which can be furnished bored to suit any size shaft which would be used with a coupling of this size. Special tabbed locking washers are used under bolt heads which effectually prevent bolts from loosening in service.

This coupling is recommended for driving water pumps, generators, air pumps or anything of a similar character not re-



Section of the New M. & E. Fabric Magneto Coupling

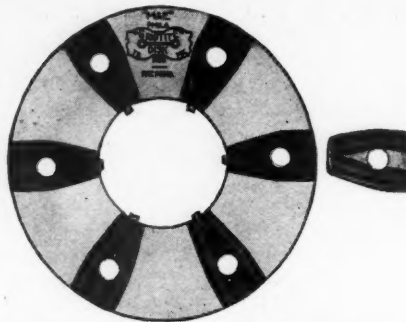
quiring accurate timing with other mechanism. The adjustable angle type coupling is used for driving magnetos and generators requiring accurate timing with the camshaft in order that the spark occur in the cylinder at the proper moment.

To adjust the timing of a magneto supplied with this coupling it is merely necessary to loosen the two small nuts on the adjustment side, rotate magneto armature to desired position and retighten nuts. Correct timing can then be marked with center punch or otherwise on the face of the flanged shaft connection piece for future reference.

The design is simple and the number of parts reduced to a minimum, all parts are of steel except the disk which is of quality fabric and the bolts are prevented from loosening by tabbed lock washers as in the fixed type. The spider and flanged shaft connection can be furnished bored to suit any size shaft and any length over all can be obtained by variations in these parts and addition of spacers between spiders and disk.

In laboratory tests this coupling shows a torque capacity of over 500 lb. inches or 8 hp. at 1000 r.p.m. and is, therefore, about ten times as powerful as the service requires.

The new Griptite Universal Joint is claimed to produce a thoroughly positive non-slip drive. The disk which is shown



Rubber and Fabric Disk of the New M. & E. Griptite Universal Joint

herewith consists of quality rubber and fabric in which are imbedded six tubular steel spreaders, one at each bolt hole, which bulge the fabric into semi-circular ridges exactly fitting the formed clamping washers.

These spreaders, imbedded in the fabric and clamped there by the action of the formed clamping washers, are in contact with the bolts and transmit to them part of the torque the disks. They are also said to increase, by displacement of the rubber, the density of the fabric and rubber immediately under the clamping washers — thus allowing considerably greater original clamping pressure on the bolts and reducing future permanent set and consequently need of frequent tightening to absolute minimum.

This design of grip is said to save fabric from undue abrasion and destruction.

Crankcase Oil Can be Renewed Economically

Just as long as automobiles are used there will be tire and engine trouble. The cord tire became popular with motorists because it increased mileage and gave better all-around motoring satisfaction. The day has now arrived when a large part of motor trouble can be eliminated. The secret, if it may be so called, is better lubrication.

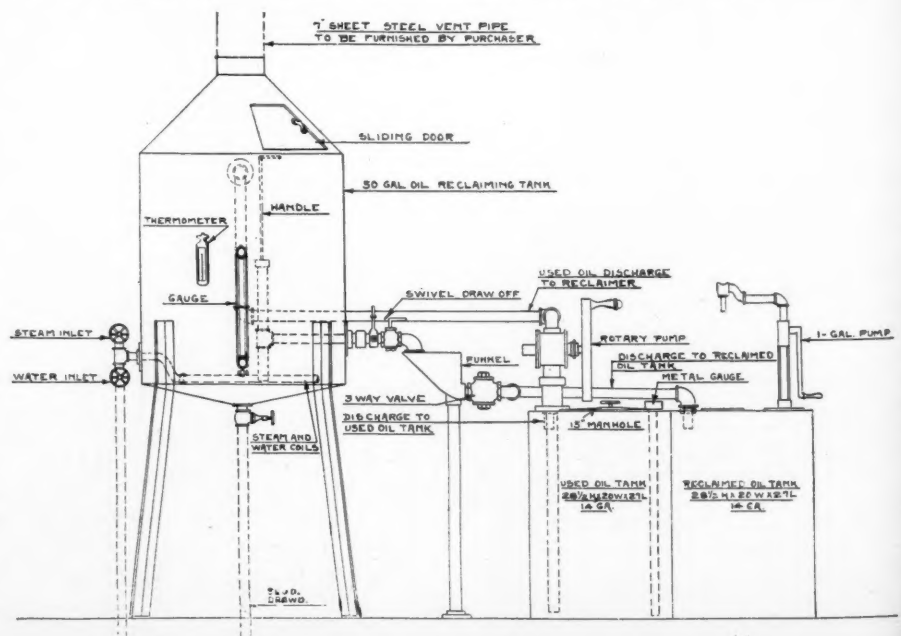
To operate an internal-combustion en-

gine without good lubrication invites low mileage, unsatisfactory performance and expensive repair bills. Prominent engineers recommend that commercial cars such as taxicabs, department stores, etc., where the car is in use constantly, have the crankcase oil changed daily. This may not, at all times, be practical but it is easily understood that the longer these oils are kept in service without reclaiming, the poorer the lubrication.

A few years ago when motor fuel of higher volatility was supplied it was less necessary to change the crankcase oil frequently because the oil did not become diluted to the extent it does today with the present heavier grade of motor fuels. This dilution can not be avoided because the unburned end of the fuel gradually finds its way past the pistons into the crankcase. Its presence there not only reduces the viscosity of the oil to an extent that it is no longer a safe lubricant but there is loss of power due to the increasing friction and loss of compression. This thinned, unsafe lubricant becomes further contaminated with foreign matter and wears away parts of the engine. The explosion chambers will no longer be sealed with a dependable oily film and the motorist is robbed of the snappy response and smooth operating power plant he is accustomed to.

S. F. Bowser & Company, Inc., Ft. Wayne, Ind., manufacturers and distributors of the Bowser oil-reclaiming outfit, states that with their outfit owners are enabled to change oils frequently without increasing lubricating oil expense. It is further pointed out that garage men, filling stations and oil companies will be quick to recognize the possibilities of such a service.

In operation it is said that but two comparatively simple operations are all that is necessary to convert that black, repulsive, offensive, gritty, oily mass into a high-grade motor lubricant. The dilution is driven out by the action of steam, and the other foreign matter, grit, dirt, worn away motor parts, etc., are removed through precipitation. The plant can be operated at a very low cost.



Plan Drawing of the Bowser Fifty-Gallon, Figure 350, Oil Reclaimer

Smith Cushion Wheel

The Smith Wheel, Inc., Syracuse, N. Y., recently added a new cushion device to its wheels for trucks. It is featured in point of design, endurance and riding quality and is stated to increase the life of a truck and enhance the efficiency of both the truck and driver.

The design and location of the cushion is claimed to be such as to give perfect suspension and greatest effectiveness. The cushion, it is pointed out, being right next to the tire, secures maximum resiliency, which is much increased through a certain design of openings in the cushion. The cushion is automatically cooled by the connection of all openings in the cushion with an air passageway running to all of the openings in the periphery of the hollow wheel, which radiates the heat.

The Smith cushion wheel is complete in four units—wheels, cushion, steel lock-



Cutaway, Showing Design of the New Smith Cushion Wheel

ing ring, and cushion retaining rim. When the four parts are assembled, all are held in place automatically, and the wheel is ready for the pressed-in tire. The construction does not include bolts, keys, or pins.

This wheel is not bulky or clumsy in appearance, but rather, its free, open construction lends to appearance, and makes the wheels and the truck easy to clean, and truck parts of easier access. The weight of the wheel is but little more than the weight of an ordinary wheel taking solid tires.

The maker states that the wheels are so designed that the tires cannot be rolled off by hitting any kind of road obstacle at high velocity and that they also possess the resiliency of pneumatics.

The cushion features have been designed by competent engineers to fulfill a definite objective; namely, to kill vibration, to give greatest resiliency, to prevent "creeping" of the tire on the cushion and the cushion on the wheel, and to correspond harmoniously with the lines of the wheel proper.

Collapsible Tire Rim

The Collapsible Rim Corporation, 1201 National Bank Bldg., New York City, has announced full production of its standard Collapsible Rim in all the popular sizes. This rim is endorsed as being thoroughly practical, and scientifically correct. It operates in an entirely new manner and is



Collapsible Tire Rim. It is Claimed to Greatly Facilitate Tire Removal

said to relieve the owner of all the annoyance that follows tire trouble.

The Collapsible Rim contains no hinges or working parts to wear or get out of order. In the event of tire trouble all that is required is removal of the tire and rim by giving the rim a sharp bounce and unlocking it.

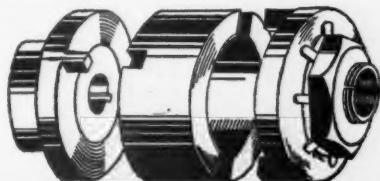
The removal of the tire is accomplished without the aid of irons, screw drivers, etc. After repairs have been made the tire is simply slipped over the rim, and the rim is securely locked by a slight pressure of the unlocking joint which snaps it back into place.

Besides making tire changing quick and easy the manufacturers claim that the rim will prolong the life of tires. Blow-outs are said to be reduced because a tire can be removed without the use of dangerous irons.

Bailey Adjustable Magneto Coupling

The Bailey adjustable magneto coupling, product of the Bailey Mfg. Co., Union City, Ind., is adaptable to trucks, tractors, passenger cars, etc. Employment of this coupling in the assembly of an engine is said to eliminate annoyance and waste time if at any time in the future repairs or adjustments make necessary a temporary removal of the unit. The time saving feature is secured in that the timing can be set with it.

The Bailey coupling is constructed with either a steel or fibre center member, for $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ and $\frac{7}{8}$ in. shafts, and for any instrument.



The Bailey Adjustable Magneto Coupling

Manzel Mechanical Chassis Lubricating System

A new system of lubrication, which enables the driver of a truck to lubricate every chassis bearing without leaving his seat at the wheel, is the new product of the Manzel Brothers Co., Babcock and Imson Streets, Buffalo, N. Y., which concern has made a specialty of lubricating devices for nearly twenty-five years. It is claimed to lubricate every bearing, shackle bolt, reach rod, steering knuckle, etc., in less than three seconds time. Actual employment of the system requires but little exertion and the operation is stated to be thorough. One or fifty points can be lubricated with equal facility.

The system consists of a small tank or reservoir fastened to the dash under the hood in which are arranged a number of pumping units, with a tube or pipe leading from each. By means of specially de-



Sectional View of the Lubricator of the Manzel Mechanical Lubricating System

signed distributors, these main pipes are divided at proper places to provide a separate line for each point to be lubricated. A rod for operating runs from the oil tank to a button on the instrument board or dash.

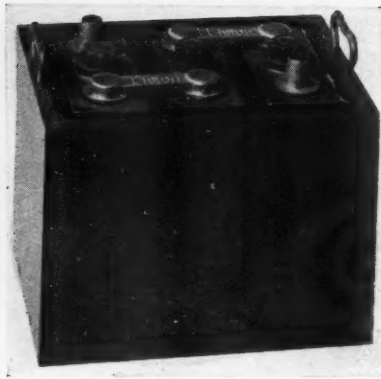
To lubricate all bearings it is only necessary to pull the button and oil is forced under pressure to every bearing on the truck. A pull once or twice a week will keep any truck properly lubricated.

This system replaces all oil and grease cups, eliminating the dirty and disagreeable job of filling and adjusting cups. By its use it is possible to lubricate a truck more quickly and easily than to throw in the clutch or put on the brakes. There is no possibility of overlooking or neglecting any bearings, for every one is taken care of automatically when lever is operated.

The system not only saves oil but assures thorough lubrication to all points.

Elston Hi-Power Storage Battery

A standard of construction has been employed in the manufacture of the Elston Hi-Power Storage battery, recently announced by the Marion-Elston Battery Co., Marion, Indiana, which is said to make for longevity and increased power.



Elston Storage Battery

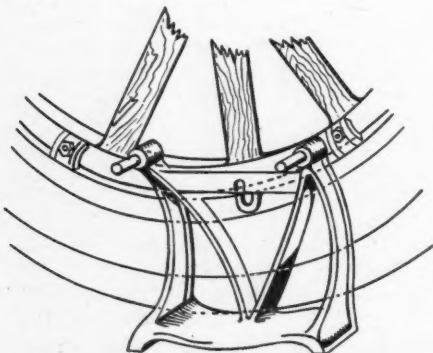
The alloy grids are specially designed. Both the positive and negative plates are hard and of great porosity, the hardness being obtained by a special combination of chemicals which, when mixed and pasted on the plate, goes through a heat treatment, and finally electrically formed for 72 hours. The negative plates are of great conductivity. Cell connectors are of special design.

Nojak Substitute for Jack

A simple invention that lets the engine lift the wheel when making tire changes is the new device offered by the Commercial Manufacturing Co., 1489 East Fort, Detroit, Mich. It also serves other uses, such as a sand and mud hook to pull a truck through heavy going, aids in putting chains on tight and quickly, and when this device is locked over a spare tire, it serves as a first-class guard. This four-purpose device is known as the Nojak.

In tire changing Nojak is claimed to insure a steady wheel and provide ample clearance for changing of a tire. It is said not only to save time and work but to spare the clothing from dirt and stains.

The construction of the device is simplicity itself as may be seen from the accompanying illustration. Strength is said to have been attained by a powerful bridge construction. The uprights have a peculiar curved back to conform to the contour of the tire. In application two extending bolts are inserted in two brass-protected holes in the felloe of the wheel. Then by driving the truck slightly ahead or back the tire is raised on the Nojak. Ample space is provided under the tire. Front or back, the Nojak can be applied to any wheel with equal ease.

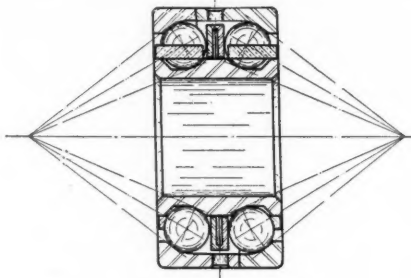


The Nojak; a Device That Facilitates Removal of Tire

The L-S-A Ball Bearing

The L-S-A Ball Bearing is manufactured by the Langhaar Ball Bearing Co., Aurora, Ind. The primary object in its manufacture was to obtain a bearing of the greatest possible capacity and durability under load from any direction, this requiring first of all two rows of balls with angular contact, to take thrust from either direction. In order to utilize the greatest possible number of the largest possible balls, without sacrificing race strength, the outer race was made in two parts. The bearing is assembled by locking the two halves of the outer race together by means of a jaw clutch construction.

Further improvement claimed in behalf of this ball bearing is correct ball rolling and self-adjustment. The self-adjustment feature is alleged to assure the maximum of service from every ball and to distribute the load uniformly. The



Langhaar Ball Bearing

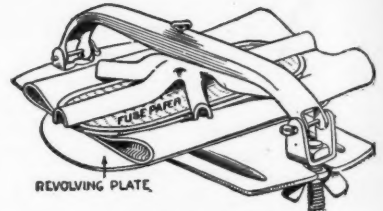
It is designed to carry loads from any direction

fact that the bearing has equal capacity for load from any direction is also of vital importance in axle construction, both front and rear. Silence, absence of play and vibration and great capacity make it adapted for transmission service.

The self-adjustment is obtained by a free ring between the ball rows. The ring is made in halves with a recess in the back of each half. Therefore, when the two halves of the ring are in position in the bearing, a closed space is between them, in which are flat arched springs of proper strength for each size bearing. It is said that these springs, from the nature of their construction, cannot get any load greater than their own original pressure. As they have almost no movement they are said to be indestructible during the life of the bearing.

The true rolling action of the bearing is easily understood by simply considering that each ball acts as a bevel pinion in a differential, mating with an internal and external bevel gear. Because the free ring between the ball rows is independent of the raceways, it is in free and true rolling contact with the balls.

Self-Explanatory View of the New Boyce Moto-Meter Light and Parking Lamp Complete.



Arsco Vulcanizer

The Arsco Vulcanizer recently put on the market by the Arsco Mfg. Co., Schenectady, N. Y., is of very light weight construction, only weighing 1 1/4 lb. It is made up of the following: Assorted sizes of patches; a cold rolled steel clamp assembled from punched parts, nickel plated; and a revolving plate on the base to adjust the patch to be cut. The retail price is \$2.

Boyce Moto-Meter Light and Parking Lamp

The Moto-Meter Co., Inc., Long Island City, N. Y., announces that it is about to put on the market the Boyce Moto-Meter Light and Parking Lamp, which has been especially designed to meet the demand for a practical means of illuminating the Boyce Moto-Meter for night driving.

The new Boyce product is so constructed that a strong beam of light is directed on the face of the Moto-Meter, which clearly illuminates the instrument while no reflections are said to be possible that would tend to confuse the driver.

This light may also be converted into a Parking Lamp. By turning the rear disk about one-half an inch six rear red windows, which give a red danger signal that can be seen a great distance, are opened. An ingenious shutter at the rear renders the red Parking Lamp invisible while driving.

The light is adjustable to any delivery car or passenger car. It is particularly interesting to note that only a two-CP tail light bulb is required. The fact that only two-CP is required has enabled the manufacturer to combine the Moto-Meter light with the Parking Lamp, thereby eliminating the burning of three lamps while the car is parked.

The whole device is most unique yet simple in construction, and entirely in keeping with other Boyce Moto-Meter products. The combined light lists at \$6. A mirror may be supplied at the small extra cost of \$1. The entire device is made of brass, nickel plated throughout. Two special brackets enable it to be readily attached to the windshield of either open or closed cars.



Will the Multiple-Wheel Truck Solve the Problem?

By RALPH C. BUSBY

THE development of the pneumatic truck tire has to considerable extent aided America's road-building program, and has stimulated truck transportation, for Government tests have shown that pneumatically equipped motor trucks cause less depreciation of road than trucks on solid tires. But under the new legislation, so widely contemplated, even pneumatically equipped five-ton trucks are being legislated against.

In this respect the multiple wheel truck looms up as a possible solution to the problem. Motor truck designing engineers, road builders and tire builders agree that the multiple wheel truck must come, in order to further stimulate truckportation, and to enable shipment of large loads via truck between cities and on shorter runs.

Actual tests, conducted by the Government Bureau of Good Roads, shows that the six-wheel motor truck, with tandem axle construction and equipped with four pneumatic tired rear wheels, not only has steadier riding qualities and better traction than the four-wheel truck, but that it is less destructive to roads, decreases both tire weight and cost, reduces axle weight, has greater braking quality and permits greater operating radius.

The first multiple wheel truck in America was developed as an experiment two years ago by engineers who held the strong conviction that the heavy tonnage truck of the future would be some sort of multiple-wheeled vehicle, just as the multiple-wheeled freight car succeeded the single truck type for hauling heavier loads.

The six-wheel truck has passed the experimental stage, however, and has reached a stage of practicability which it is believed will solve not only road problems, but haulage problems as well, for users of motor trucks for long shipments.

Actual Government tests with the six-wheel truck have shown that this multiple wheel vehicle, with its load distributed on four rear wheels instead of two, has a possible carrying capacity of an eight and three-quarter ton pay load, with less damage resulting from impact to the roadway, than from a two-ton truck on the same size pneumatic tires as the multiple wheel truck. These tests were made of the relative impacts from a 2-in. drop, with the vehicles traveling at a speed of 17½ miles an hour.

The six-wheel truck on 40 x 8 in. pneumatic tires, with a gross weight of 28,700 lb., which included an 8¾-ton pay load, showed an impact of 7000 lb. per wheel. The two-ton truck on 40 x 8-in. pneumatics, with a gross weight of 11,800 lb., showed an impact of 7300 lb. A five-ton truck, with 6-ton pay load and gross

weight of 27,900 lb., on 40 x 8-in. and 48 x 12-in. pneumatics, showed an impact of 11,900 lb. The same five-ton truck, with 5-ton pay load, and gross weight of 19,800 lb., equipped with 36 x 5-in. and 40 x 6-in. dual solid tires, had an impact of 29,000 lb. under the tests made.

The road impact of pneumatic tires, as compared to solids, on the same gross weight and same sized truck, is shown by tests on the two-ton truck on both pneumatics and solids. The truck, with gross weight of 11,800 lb., showed an impact of 7300 lb. per wheel on pneumatics, as compared to 21,900 lb. on solids, both tests being made over a 2-in. drop and under a speed of 17½ miles an hour.

It is stated by Government engineers conducting the tests that it is believed the multiple wheel, pneumatically-tired truck would operate under any law passed, no matter how drastic such legislation might be.

It is shown by the tests that the same gross load supported by four wheels instead of two decreases the individual wheel loads, and also decreases the maximum intensity of pressure on the sub-grade of the road.

It is stated authoritatively that it is possible to build six-wheel trucks, ranging in size from 3½ tons up to 8 tons, and have them do less road damage than the present five-ton conventional truck. It is also stated by designing engineers that the cost of manufacturing the multiple-wheel truck would be no greater than

the cost of manufacturing conventional trucks of the same capacities.

From the consumer or truck-user standpoint, the multiple wheel truck would permit great economy in operation. It has four-wheel truck. In fact, motor truck manufacturers are now designing their new five-ton trucks for a speed of 11 miles an hour, while the six-wheel truck is capable of 45 miles an hour even when heavily loaded. From a basis of operating costs, it is figured that a five-ton six-wheel pneumatically tired truck could be operated for the same cost as a solid tired 3½-ton four-wheel truck. These calculations have been made upon the national standard cost system basis, and from actual comparative tests. As to tire equipment cost, it is stated that six 40 x 8 pneumatic tires for the six-wheel truck would cost less than four larger sized pneumatic tires for the conventional truck carrying the same load.

With a five-ton load the six-wheel truck, by actual demonstration, negotiates 6.4 miles per gallon of gasoline as compared to about 4 miles per gallon for five-ton four-wheel trucks. The multiple wheel vehicle also gets 1000 miles out of a gallon of oil as compared to 200 miles for the average truck. It steers easier, has easier riding qualities, diminishes the strain on the chassis as well as the road, and has greater braking capacity, as brakes are supplied on four wheels instead of two.

The increased speed of the multiple wheel truck, providing greater operating



Showing Flexibility of Two Rear Axles With Diagonally Opposed Wheels Raised to a Height of Ten and a Half Inches. Also Illustrates Torque System for This Type of Axle

radius, is another significant factor pointed out. The truck's increased speed gives more miles of operation per day than two conventional trucks. This has been demonstrated between Akron and Cleveland, Ohio, the six-wheel truck making two round trips a day, of about 75 miles a round trip, as compared to one round trip for conventional trucks.

The multiple wheel truck used for the government impact tests has a wheelbase

of 180 in., from center of front wheel to center between rear wheels, and has six speeds forward and two reverse.

Other specifications are:
Tires—40 x 8 in. pneumatics all around.
Engine 65 hp., 3200 in. lb. torque at 1200 r.p.m.

Transmission—60 U.P.P. auxiliary.
Clutch—60 multiple disk.
Gear ratios—low, 82 to 1; second, 35.7 to 1; third, 23.2 to 1; fourth, 20.1 to 1;

fifth, 10 to 1; sixth, 5.8 to 1; low reverse, 99.5 to 1; high reverse, 28.4 to 1.

Rear axles—worm drive arranged in tandem. Ratio 5.8 to 1. Equipped with four 21 in. diameter brakes of 5½ in. width, in pairs 2¾ in. wide.

Gasoline capacity—67 gal. Oil—10 gal. Turning radius—35 ft. Chassis weight—8500 lb.

N rmal speed—25 m.p.h. Maximum speed, under full load on level—45 m.p.h.

Speaking of "Short Hauls"

Family Goods Moved 234 Miles by Motor Truck Much Quicker and Cheaper Than Possible by Rail

MOVING from one California city to another is not the bugaboo it was a decade ago. The motor truck and good roads is the combination that has brought about the improvement. This fact was brought forcibly to the writer's attention by a friend who in 1910 moved from Fresno to Los Angeles, 234 miles, and who, less than a month ago, moved back to his former home.

Here is his story:

"I well remember when I moved my family and the domestic impedimenta from Fresno to Los Angeles ten years ago. For weeks we were deep in the throes of packing, and for several days two men were on the job crating every stick of furniture that was liable to damage in transport. Then came moving day. The stuff was packed into two horse wagons, which deposited their loads at the freight platform, where it was carried into a freight car. As I remember it, there was about three-quarters of a carload.

"The following day I went to Los Angeles and waited twelve days for the freight car. It had been held at Fresno until the remainder of the carload could be secured. Meanwhile living was expensive. Finally after the car was 'spotted' I had to pay the cost of hauling the furniture to my new home, and uncrating it.

"What a difference when I moved back from Fresno! When everything was ready I arranged with a motor express company, which makes a specialty of long distance hauling of household goods, to transport my stuff to Fresno. They started from Los Angeles at 10 o'clock one morning, and the furniture was in the house before we sat down to supper the following night.

"I know I saved considerable in actual money by using the motor truck instead of the railroad, but what counted most was the saving in time, and the fact that I had to patronize a hotel but one night. The saving in crating costs was also a feature."

After investigation the writer discovered that the motor express company that did the moving job is now operating a 36 hour service between Los Angeles and San Francisco, and has offices in Bakersfield, Fresno, Modesto, Sacramento and other cities, besides the main offices at the two

termini. One of the trucks, a 3½ ton Wolverine, is shown in the accompanying illustration.

Two men constitute the crew of each truck. Over the cab is a berth, where one man sleeps while the other drives. Driving all night long, there is no difficulty in keeping to schedule, even though the average speed is but 15 m.p.h.

Mr. Nelson, the manager, called attention to the fact that the rates for the long distance moving of furniture and household goods by motor truck increase with the distance to be covered, whereas the railroads have lower rates to those points where there is water competition. Thus, he says, the rail rate to Modesto is higher than it is to San Francisco, although the latter is over 100 miles farther away from Los Angeles.

Asked for a comparison of the costs of transporting 4000 pounds of household goods from Los Angeles to Fresno by rail and by motor truck, Mr. Nelson said: "Omitting the element of quick time made by using trucks the saving is considerable. First, consider the cost to get the load to Fresno by rail. To begin with, about \$25 is the initial cost to crate the goods. For hauling to the railroad station a charge of \$20 is usual. At \$1.15½ per hundred, the freight charge on 6000 pounds—you must remember that crating adds about 50 per cent to the total weight—will be \$69.30. Then comes another \$20 for taking the stuff from the freight yards to the house

in Fresno, to which must be added, say, \$10 for uncrating. That makes a total of \$204.30.

To do the same job by motor truck, there is the minimum 3000 pound load charge of \$156.60, and the charge of \$2.70 per hundred weight for all loads over 3000 pounds. Deducting the 2000 lb. crating weight avoided in truck transport, the extra weight charge is \$27. This makes a total of \$183.60 for 4000 lb. Shippers can insure the full value of their goods, whereas the railroads pay only 10 cents on the dollar in the event of damage.

"As regards time, we can deliver a truck load of household goods from Los Angeles, say, to Fresno—stripping a fully furnished house and placing the furniture in the new house—in considerably less than 48 hours. Thus a family will be deprived of the comforts of a fully furnished home for only two days, while shipping household goods by rail between the same two points means that the family will be homeless for from 10 days to two weeks—with the additional expense entailed by hotel during that period."

The 3½ ton Wolverine trucks engaged were purchased through the Braun-Stecker-Stevens, Inc., 823 S. Flower St., Los Angeles, Cal., western distributors, and the chassis are fitted with Distel wheels, with 12 inch Swinehart cushion tires on the rear, and are equipped with an electric starting and lighting system.



The Factor That Reduced the Long Arduous Task of Long Distance Moving to a Trivial Matter

The technical knowledge that comes to you from **SKF** engineers is



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This fund of engineering information we bring to the fabrication of all products bearing the mark **SKF** and the operation of those industries which we are requested to supervise. In order that complete reliance may be placed in the endorsement expressed by the mark **SKF** it is necessary not alone that we control and supervise each step in the manufacture of a product but also its final installation.

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Taken From Current House Organs

"Did I Ever Tell You About the Time I"—Etc., Etc.?

The only vacant seat in the lunch room was at a table with three other men who were apparently lunching together. Sitting there in the fourth place the conversation that was general among them was, of course, perfectly audible to me. They were quite obviously automobile salesmen and were, of course, telling each other how good they were.

"Did I ever tell you about the time I took that Lemon Six in on a trade for four hundred dollars? Well, I got a chance to turn it in a few days time without a loss, but I had a hunch that if I held it a while I could catch a sucker. There's one born every minute, you know, so I figured I ought to be able to land one in a few weeks.

"Sure enough, along came a guy in about two weeks with a flivver coupe who wanted a larger car. Say! did I sell him that lemon? I'll say I did! I took in his coupe and stung him three hundred dollars to boot. It gave me a perfectly good flivver coupe for one hundred bucks—worth six hundred. Some deal, what?"

"That reminds me"—began the short fat salesman, but the tall red-headed one beat him to it.

"Say, if you think you stung that bird, listen to this." And he went on to relate a similar tale of gouging an ignorant buyer.

Now, what I want to know is WHY are so many men proud of doing things like that? Why do salesmen and business men who have passed the salesman point, boast of their deeds of cheating? It does not prove any unusual ability—anyone can do it—it is simply a case of taking every possible advantage of an uninformed and trusting customer.

If a man told a story of how he COULD have stung someone for an illegitimate profit, but DIDN'T, you could understand his perfectly pardonable pride, but what is it that makes a man think people will admire him for being a crook?—*De Luze Reinforcements*, Clark-Turner Piston Co., Los Angeles, Cal.

Watch Your Vocal Speedometer

One of the most important things for a salesman to learn is when to stop talking.

Every man who is being sold usually likes an opportunity to express some of his own views, and while he may be a good, patient listener, he is quite apt to be more receptive if he sees that the salesman is polite enough to be interested in what he also may have to say.

Another thing that is important is to make a graceful, "get-a-way" as soon after making the sale, as possible. Many a good sale has been lost, after it is made, and really, you know, your mission has been accomplished when you have secured

the customer's signature on the dotted line. What good excuse would you have for remaining longer?—*Milwaukee Tank News*, Milwaukee Tank Works, Milwaukee, Wis.

"Ruining the Roads"

I've been out in the rural districts quite a bit lately, and I've found considerable prejudice against what is popularly designated as "the big motor trucks."

Wherever I came across a very bad piece of highway, the natives were always there with the statement that "the big motor ruined that road," and "they're cutting our highways all to pieces."

In a number of cases, I examined the roads carefully, and in most of them I failed to find any evidences of big truck traffic. In nearly every instance the ruts and cuts were made by tires much smaller than are used on "big motor trucks."

But some of the highways that I encountered were in deplorably bad condition, and my investigations have convinced me that this bad condition is largely due to the overloading and overspreading of the smaller sized trucks.

On one road that was very much cut up I saw a three-quarter-ton truck loaded with thirty-seven cans of milk. I was told that each can and its contents weighed "better than eighty-five pounds." This three-quarter-tonner was therefore carrying more than three thousand pounds—an overload of more than one hundred per cent. Its four-inch pneumatic tires had cut deeply into the soft, rain-soaked roadway. The driver was quite proud of his

truck. He claimed that he averaged "about twenty miles an hour" and "hit thirty in spots." And he's still at large.

While the prejudice against the "big motor trucks" is, to my way of thinking, largely unwarranted, I must say that there are some owners and drivers who should be in limbo. These birds, regardless of the rights of others and with no thought of what they are doing to the public highways, are overloading and overspeeding their large trucks. Worse still, they treat with contempt all protests against their destructive and, at times, unlawful acts. They are responsible for much of the prejudice against the "big motor trucks." To stop them, there is a loud demand for restrictive legislation, which will, as it invariably does, go too far. Thus the many will suffer for the faults of the few.

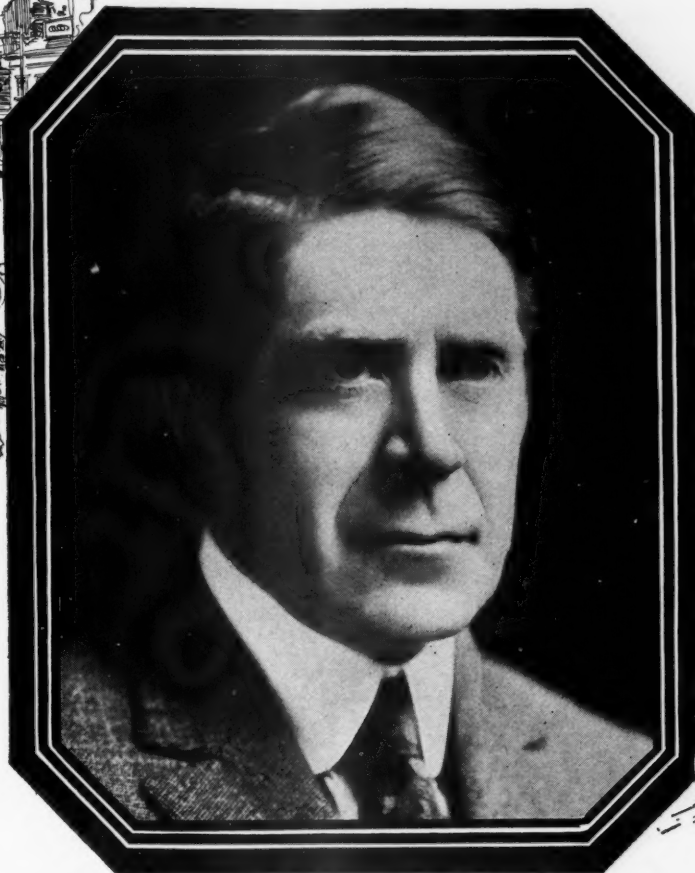
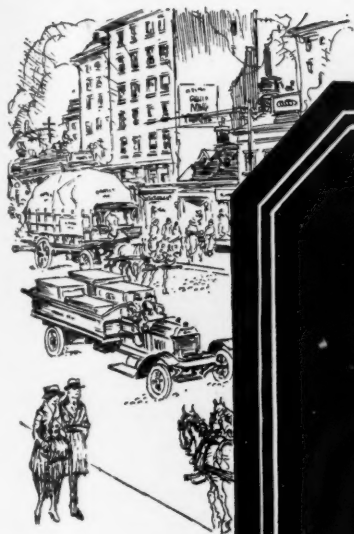
Good highways cost a lot of money nowadays, and if properly used they yield big profits to the public at large. They should be protected from the abuse occasioned by overloading and overspeeding, whether the truck be large or small. Men who know take the ground that a small truck overloaded or overspeeded inflicts far greater damage to the road than does a very large truck carrying only a capacity load at a reasonably rated speed.—*Driver Dan*, Sterling Motor Truck Co., Milwaukee, Wis.

A compound internal combustion motor using both coal oil and gasoline, together or separately, is the invention of Louis L. Luce, 170 Chapman St., Portland, Ore.



This Outfit Not Only Appears to be, But is an Impregnable Bank Against Which Burglarious Efforts Would be Futile

The job was built complete at the factory of the Brockway Motor Truck Co. on the company's new Model E 3/4 ton chassis. This traveling bank which is employed in Boston as a bank runner is lined with steel and modern in every constructive detail



He Built the Largest Truck Company in the World

Industrial History:

Eight years ago Frank W. Ruggles built his first truck—with his own hands. He saw tremendous possibilities for the truck industry. He convinced a few of his associates of the soundness of his logic and secured their support. In 1913, with an insignificant sum as capital, he organized his company and began operations. Things began to happen. Obstacles dwindled before Ruggles' energetic personality.

In seven years he had mounted to the top—he had built the largest motor truck plant in the world—he had produced and sold more trucks than any other manufacturer.

Future Plans:

Mr. Ruggles' forte has been his almost uncanny ability to anticipate requirements of the future far in advance of competition. His past success proves this. Seven successful years of building motor trucks have given Mr. Ruggles priceless first-hand information on the best ways to meet those requirements practically—now he promises the industrial world another truck success even more remarkable than the first. A Better Truck—Better Value—Better Sales Policy—Better Service Policy—Better Organization—Best Financial Backing.

Dealers:

Announcement of the Ruggles Truck will appear in the September issue of this publication. Watch for it! Advance information will be supplied you upon request.

RUGGLES MOTOR TRUCK COMPANY, Saginaw, Michigan

Canadian Factory: Ruggles Motor Truck Co., Ltd., London, Ont., Canada



Metal and Rubber Markets

Steel Holding Its Own

The steel market after a flurry has evidently settled down to routine summer business on which expectations are not based too high. The mills of the Corporation and those of the independents are running at an exceptionally low rate of capacity and the outturn during July was in proportion.

Steel Products Prices

Per ton—Pittsburgh—	
Bessemer billets	33 00 a
Open hearth	33 00 a
Sheet bars	35 00 a
Slabs	34 00 a

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	2 65 a
Philadelphia	3 00 a
New York	3 03 a
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	4 50 a
New York	4 83 a

Finished Iron and Steel

Tank plates, Pittsburgh	1 90 a
Tank plates, New York	2 28 a
Steel bars, New York	2 28 a
Steel bars, Pittsburgh	1 90 a

Iron and Steel at Pittsburgh

Bessemer iron	22 96 a	23 46
Bessemer steel, f.o.b. Pitts.	33 00 a	
Skelp, grooved steel	2 00 a	
Skelp, sheared steel	2 00 a	
Strip steel, cold	4 25 a	4 75
Strip steel, hot	2 50 a	2 60
Ferromanganese (80%)	75 00 a	80 00
Steel, melting scrap	12 00 a	12 50
Iron bars, refined	2 50 a	2 65

Miscellaneous Metals

Copper sheets, not rolled	20 50 a	20 75
Copper bottoms	28 00 a	28 25
Copper rolls	19 50 a	19 95
Copper rods	19 25 a	20 00
Seamless tubing, bronze	21 00 a	
Seamless tubing, copper	21 00 a	
Seamless high brass tubing	18 50 a	
Seamless low brass tubing	20 00 a	
Low brass sheets	17 25 a	
Low brass rods	18 25 a	
Brazed tubing, brass	27 00 a	
Brazed tubing, bronze	31 75 a	
Brazed tubing, copper	31 75 a	

ANTIMONY.—The market continues easy under light demand and ample local stocks.

MANGANESE.—There is no improvement in demand for manganese and chrome, and the market for both is easy without attracting buyers who are well supplied.

OLD METALS.—The scrap metal market is at a standstill. Consumers are out of it and dealers are not anxious to buy or to force sales.

Following are sellers' and buyers' prices f.o.b. New York:

Aluminum—	Buying.	Selling.
Cast scrap	8½a 8½	9½a10
Sheet scrap	8½a 8½	9½a10
Clippings	12½a13½	15½a16½
Copper—		
Heavy machinery comp.	8½a 9½	10 a10½

Heavy and wire	8¼a 8½	9½a 9¾
Light and bottoms	7¼a 7¾	8½a 8¾
Heavy, cut and crucible.	9¼a 9½	10½a11
Brass, heavy	4½a 4¾	5¼a 5½
Brass, casting	5¼a 5¾	6½a 6¾
Brass, light	3¼a 3¾	4½a 4¾
No. 1 clean brass turn'gs	4¼a 4½	5 a 5¼
No. 1 comp. turnings	6¼a 6½	7¼a 7¾
Tea lead	2½a 2¾	2½a 2¾
Lead, heavy	3¼a 3½	3¾a 4
Zinc scrap	2 a 2½	3 a 3¼
Solder joints	5 a 5½	6 a 6¼
New zinc clippings	3½a 4	4 a 4½
Pewter dishes	15 a16	17 a18
Block tin, scrap	25 a25½	26 a27

Rubber Market Easier

With less bullish advices from Singapore, where demand from American buyers has been for the time satisfied, apparently, the tone of the local market for

plantation rubber has been slightly easier.

Para—Up-river, fine	16½a
Up-river, coarse	7¾a
Island, fine	16½a
Island, coarse	7 a
Cameta	7¼a
Amber—No. 1	12 a
No. 2	11½a
No. 3	11 a
Smoked ribbed sheets	15¼a
*Centrals—Corinto	a 6
*Esmeralda	a 6
*Mexican scrap	a 5
*Guayule, wet	a 10
*Guayule, dry	a 25
*Balata, block, Trinidad	a 73
*Balata, block, Colombian	a 26
*Balata, Panama	a 25
*Balata, sheet	a 71

* Nominal.

SCRAP RUBBER.—There has been no change in the situation, demand being light and prices nominal.

Tires, automobile	1 a
Inner tubes, No. 2	a 4
Inner tubes, No. 1	a 6

Luxurious Limousine-Coach Mounted on Truck Chassis

Two buses, believed to be the most luxurious and expensive in service, have just been put into operation in Chicago by the management of the Edgewater Beach Hotel. They are used to transport passengers between the hotel and the downtown shopping districts.

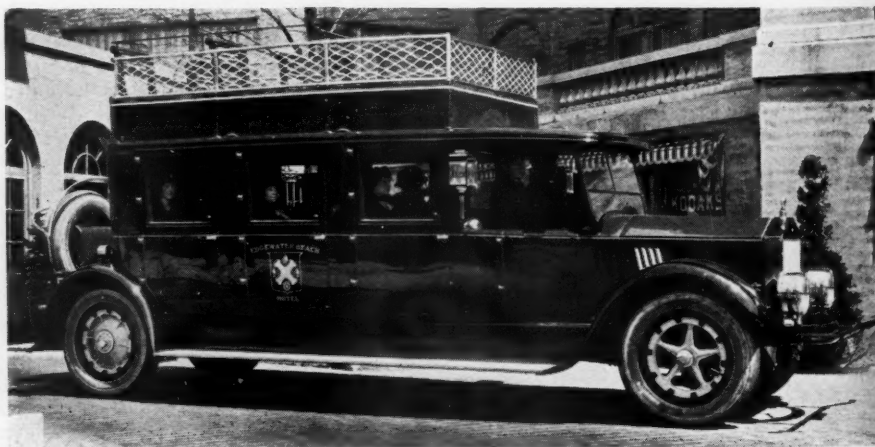
These veritable limousine-coaches were conceived by Benjamin H. Marshall, of Marshall & Fox, one of the engineers of the C. P. Kimball & Co., coach builders, Chicago, Ill. Every consideration and care was given to the minutest detail, and such attention to luxury and appointments has been given as to make for the greatest beautiful effect and comfort.

The hood, radiator, fenders, running boards, auxiliary tire carriers, bumpers, etc., were all supplied by the C. P. Kimball Co. This job, which has been designed to conform to the best standards of body construction, completely transforms the White chassis, on which it is mounted, from a commercial to a passenger car.

One of the most noteworthy features in the construction is that the chassis has been lowered with a view of retaining all the attractive lines of limousine construction. This required the removal of one of the leaves in the springs, and "dishing" into the frame, and then welding reinforcements on the side.

The three interior sections hold four passengers each, while nine can be accommodated on the roof deck. The upholstery is in mohair plush and the backs of the seats are anchored to patent devices that permit the upholstery section of the backs to work up and down, thereby cushioning any possible jolts due to car tracks or rough spots in the streets.

Illumination for reading at night is one of the features. The doors are equipped with automatic electric locks, controlled by the driver, who unlocks them whenever the bus is stopped. The color scheme is green and yellow, with black accentuations. All the mountings are brass and include the rail around the roof deck and hand rails for the deck steps. The cost complete for these jobs, two of which are employed by the hotel, is about \$17,000 per car.



This Most Sumptuous of Passenger Vehicles Represents Another Service of the Edgewater Beach Hotel, Chicago, Illinois


*Better Motoring
for the User
Better Business
for the Dealer*



**JOHNS~
MANVILLE**

*Automotive
Equipment*

CAPO
BIANCO
1917



Eight chances for profit from each of your car owners

ONE big advantage you have in stocking the complete Johns-Manville line is that every car owner who comes into your showroom is a potential customer for several items.

In other words the line increases your sales opportunity eight-fold.

Dealers appreciating this and also the prestige that the name Johns-Manville gives to a product have grouped these eight specialties together in their displays.

Each one contributes to economical car operation and for an excellent reason.

Johns-Manville makes no evenly competitive products—each must have a distinct, exclusive, engineering advantage before it is entitled to a place in the line.

When you sell any one of these products you sell not only added service, but added economy.

Just read on the opposite page the extra service you sell to a customer when he buys a Johns-Manville specialty.

Johns-Manville NON-BURN Asbestos Brake Lining

The quality of an asbestos brake lining can be no better than the quality of its asbestos fibre. Johns-Manville being the world's largest producer of asbestos and asbestos products, picks the fibres best suited for this important service.

Johns-Manville Asbestos Friction Clutch Facing

This clutch facing is a development from Johns-Manville experience in making brake blocks for industrial cranes and hoists. Made up in sizes for the representative cars requiring facings and packaged. You can get them quickly from any of the distributors on page four. And you can do a good facing job because the facings are accurately machined.

Johns-Manville Speedometer for Ford Cars

A handsome, sturdy and accurate Speedometer, made especially for Ford cars equipped with self-starters—can be quickly installed—a good seller—reasonably priced.

Johns-Manville Hubodometer for Ford Trucks

The simplest mileage recording device for commercial cars—quickly attached. Sturdy, reliable, permanent, and greaseproof.

Johns-Manville Automotive Sheet Packing

Siegelite

For gasketing water manifolds, differential housing, carburetors, etc. Resists action of water, oil and gasoline.

Service

Withstands high heat temperatures as on intake and exhaust manifolds, cylinder heads, etc.

Johns-Manville "NOARK" Lighting Fuses

An attractive display carton of both fibre and glass tubes. Give your customers the protection that comes from accurate rating.

Johns-Manville Automobile Tape

A permanently adhesive tape. Guaranteed not to dry out. Attractive display package.



Choose your Distributor

Alabama

The I. J. Cooper Rubber Co., Birmingham
Moore-Handley Hardware Co., Birmingham
Johnson Tire & Auto Co., Montgomery

Arkansas

Crow-Burlingame Co., Little Rock

California

Chanslor & Lyon Co., Fresno
Chanslor & Lyon Co., Los Angeles
Featherstone, E. A., Los Angeles
McCoy Motor Supply Co., Los Angeles
Waterhouse & Lester Co., Los Angeles
Weinstock-Nichols Co., Los Angeles
Western Rubber & Supply Co., Los Angeles
Chanslor & Lyon Co., Oakland
Weinstock-Nichols Co., Oakland
Kimball-Upson Co., Sacramento
P. W. Gavin Company, Inc., San Diego
Chanslor & Lyon Co., San Francisco
Electric Appliance Company, San Francisco
McCoy Motor Supply Co., San Francisco
Waterhouse & Lester Co., San Francisco
Weinstock-Nichols Co., San Francisco

Colorado

Auto Equipment Co., Denver
Foster Auto Supply Co., Denver
Motor Accessories & Tire Co., Pueblo

Connecticut

Hessel & Hoppen Co., New Haven
Motor Tire Service Co., Putnam

District of Columbia

National Electrical Supply Co.,
Rubel, Chas., & Co.

Florida

Baughman Company, Norman G., Jacksonville
Baughman Company, Norman G., Miami
Baughman Company, Norman G., Tampa

Georgia

Alexander-Seewald Co., Atlanta
The I. J. Cooper Rubber Co., Atlanta
Cody Co., W. E., Columbus

Illinois

Automobile Supply Co., Chicago
Chicago Automobile Supply House, Chicago
Electric Appliance Company, Chicago
Motor Car Supply Co., Chicago
The I. J. Cooper Rubber Co., Chicago
Universal Automotive Supply Co., Chicago
Tenk Hardware Co., Quincy
Washington Auto Supply Co., Washington

Indiana

Orr Iron Co., Evansville
Lomont & Co., Ft. Wayne
The Gibson Co., Indianapolis
The I. J. Cooper Rubber Co., Indianapolis

Iowa

Cedar Rapids Pump Co., Cedar Rapids
Sleg Co., Davenport
Herring Motor Co., Des Moines
Repass Auto Co., Waterloo

Kansas

The Frank Colladay Hardware Co., Hutchinson
Watson-Weldon Co., Salina
Southwick Auto Supply Co., Topeka
Massey Hardware Company, Wichita

Kentucky

Peaslee-Gaubert Co., Louisville
The I. J. Cooper Rubber Co., Louisville

Louisiana

Electric Appliance Company, New Orleans
Shuler Auto Supply Co., New Orleans

Maine

Bigelow & Dowse Co., Bangor
The Farrar-Brown Company, Inc., Portland

Maryland

Auto Supply Co., Baltimore
Coggins & Owens, Baltimore

Massachusetts

Bigelow & Dowse Co., Boston
Linscott Supply Co., Boston
Wetmore-Savage Co., Boston
Motor Tire Service Co., Fitchburg
Bigelow & Dowse Co., Springfield
Duncan & Goodell Co., Worcester
Motor Tire Service Co., Worcester

Michigan

Bowman Gould Co., Detroit
Roehm & Davison, Detroit
Tisch Auto Supply Co., Grand Rapids

Minnesota

Kelley-Duluth Co., Duluth
Janney-Semple-Hill & Co., Minneapolis
Minneapolis Iron Store Co., Minneapolis
Reinhard Bros. Co., Minneapolis
Williams Hardware Co., Minneapolis
Nicols, Dean & Gregg, St. Paul

Missouri

Joplin Supply Co., Carthage
Joplin Supply Co., Joplin
The Faeth Company, Kansas City
Ayers Farmer Auto Supply Co., St. Joseph
Beck & Corbitt Iron Co., St. Louis
Fred Campbell Auto Supply Co., St. Louis
Geller, Ward & Haaser, St. Louis
The I. J. Cooper Rubber Co., St. Louis
Rogers & Baldwin Hardware Co., Springfield
Joplin Supply Co., Webb City

Montana

Northwestern Auto Supply Co., Billings

Nebraska

Nebraska Buick Auto Co., Lincoln
Western Auto Supply Co., Omaha

Nevada

Nevada Auto Supply Co., Reno

New Hampshire

Thompson & Hoague Co., Concord

New Jersey

Economy Auto Supply Co., Newark

New York

Albany Hardware & Iron Co., Albany
Martin Evans Co., Brooklyn
Strauss Co., Joseph, Buffalo
Barker, Rose & Clinton Co., Elmira
Picard & Co., Inc., A. J., New York
Clancy Hardware Company, Syracuse
Roberts Electric Supply Co., H. C., Syracuse

North Carolina

Carolinas Auto Supply House, Charlotte
Automobile Supply Co., Wilmington

North Dakota

Grant, J. D., Fargo

Ohio

The Penn. Rubber & Supply Co., Akron
C. & D. Auto Supply Co., Cincinnati
The I. J. Cooper Rubber Co., Cincinnati
The Penn. Rubber & Supply Co., Cincinnati
The I. J. Cooper Rubber Co., Cleveland
The Penn. Rubber & Supply Co., Cleveland
The I. J. Cooper Rubber Co., Columbus
The Penn. Rubber & Supply Co., Columbus
Justus & Parker Co., Columbus
The I. J. Cooper Rubber Co., Dayton
The I. J. Cooper Rubber Co., Toledo
The Penn. Rubber & Supply Co., Toledo
The Penn. Rubber & Supply Co., Youngstown

Oklahoma

Joplin Supply Co., Commerce
Severin Tire & Supply Co., Oklahoma City
Joplin Supply Co., Tar River
Tulsa Motor Supply Co., Tulsa

Oregon

Wiggins Company, Inc., Portland
Chanslor & Lyon Co., Portland
Waterhouse & Lester Co., Portland

Pennsylvania

Motor Accessories Co., Allentown
General Motor Supply Co., Altoona
The Penn. Rubber & Supply Co., Erie
Front Market Motor Supply Co., Harrisburg
Johnstown Auto Co., Johnstown
General Auto Supply Co., Lancaster
General Auto Supply Co., Lebanon
The Penn. Rubber & Supply Co., Oil City
Berrodin Rubber Co., Philadelphia
Gaul, Derr & Shearer Co., Philadelphia
Roberts Electric Supply Co., H. C., Philadelphia
Dyke Motor Supply Co., Pittsburgh
Jackson Motor Supply Co., Pittsburgh
Lansing Bros., Inc., Scranton
General Auto Supply Co., York

Rhode Island

Belcher & Loomis Hardware Co., Providence

South Carolina

Frankie Co., Inc., C. D., Charleston

South Dakota

L. & L. Motor Supply Co., Sioux Falls

Tennessee

Southern Auto Supply Co., Chattanooga
The I. J. Cooper Rubber Co., Knoxville
The I. J. Cooper Rubber Co., Memphis
Osburn-Abston & Co., Memphis
Auto Supply Co., Nashville
The I. J. Cooper Rubber Co., Nashville

Texas

Electric Appliance Company, Dallas
Tri-State Accessories Corp., El Paso
Meyer Co., Jos. F., Houston
The Southern Equipment Co., Houston
The Southern Equipment Co., San Antonio
McCauley-Ward Motor Supply Co., Waco

Utah

Inter-Mountain Electric Co., Salt Lake City
Motor Mercantile Co., Salt Lake City

Virginia

Owens-Merritt, Danville
Piedmont Hardware Co., Danville
Crump Co., Benj. T., Richmond
Meadows-Price Co., Roanoke

Washington

Chanslor & Lyon Co., Seattle
Reynolds & Reynolds, Seattle
Chanslor & Lyon Co., Spokane
Holley-Mason Hardware Co., Spokane
Chanslor & Lyon Co., Tacoma
Reynolds & Reynolds, Tacoma

West Virginia

Williams Hardware Co., Clarksburg

Wisconsin

Andrae & Sons Co., Julius, Milwaukee
Shadbolt & Boyd Iron Co., Milwaukee
Tisch Auto Supply Co., Milwaukee
Western Motor Supply Co., Milwaukee

CANADA

Alberta

Motor Car Supply Co., Calgary
The Chapin Co., Ltd., Calgary
Wood, Vallance & Adams, Ltd., Calgary
Motor Car Supply Co., Edmonton
Marshall Wells Co., Limited, Edmonton

British Columbia

Wood, Vallance & Leggat, Ltd., Vancouver

Manitoba

Wood, Vallance, Ltd., Winnipeg

Ontario

Whites, Limited, Collingwood
Wood, Alexander & James, Hamilton
Just Motors Limited, Ottawa
Wood, Alexander & James, Toronto
Bowman Anthony Co., Windsor

Saskatchewan

Wood, Vallance, Limited, Regina

Quebec

Omer De Serres, Montreal

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FIRE
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FLOORING

Our London Letter

By OUR SPECIAL CORRESPONDENT

New Speed and Weight Regulations

The past month has seen the issue of a new regulation fixing the maximum unladen weight of motor vehicles at $7\frac{1}{4}$ tons, or with trailer $9\frac{3}{4}$ tons total. But the long overdue legislation fixing laden weights and speeds was again hung up, this time because the new regulations, recently promulgated in France, fixed much higher speeds than were ever contemplated by the British authorities. Consequently the whole subject has been reconsidered from the beginning, as the reputation of the French Department of Ponts et Chaussées stands very high in England.

Nevertheless there is good reason to believe that these proposals as they at present stand introduce one or two new principles. Special limits, for instance, are to be allowed big cars with pneumatic tires. Such machines weighing up to 8400 lb. unladen if the weight on any axle does not exceed 8960 lb. and the outside wheel diameter is not less than 36 in. are to be allowed speeds of 24 m.p.h., and if hauling a pneumatic trailer not over 4480 lb. unladen, will be allowed to travel at 16 m.p.h.

The new regulations will lead to big trailer developments, for even if both vehicles are on solid rubber tires a speed of 12 m.p.h. will be allowed for trailers under the 4480 lb. limit, 8 m.p.h. above that unladen weight, assuming always that the hauling car is eligible for the speeds mentioned.

In this connection a new principle has been introduced by allowing higher speeds and in some cases weights to cars with larger wheels. Thus a $3\frac{3}{4}$ ton truck or bus on solid rubber tires will be allowed to travel at 20 m.p.h. if the wheel rim diameter is not less than 37 in., but only at 16 m.p.h. if the diameter does not exceed 41 in.; $5\frac{1}{2}$ tonners are to be allowed 16 and 12 m.p.h. and $7\frac{1}{4}$ tonners 12 and 8 m.p.h. on wheels of these sizes.

Also in the heavy-sized cars a laden axle weight of 10 tons will probably be allowed for 3 ft. 9 in. wheels, but only 9 tons for 3 ft. 6 in. wheels, which are the largest usually fitted. Maximum laden axle weight limits have been raised with steamers in view; if petrol engines were to be built up to them they would be, and possibly will be, huge machines. Before long we shall certainly see larger and larger business automobiles.

Passenger Travel Developing Rapidly

There are big developments in observation car traffic over here, or motor coaching as we are coming to call it. One firm new to the business is making a great splash. Not only are they putting numbers of cars on the road, but under a big advertising scheme propose to develop a large site in London as a central motor coach station, comprising loading platforms on lines similar to those of a terminal railway station on a small scale. In the center of London the capital

charges alone on a plot of the necessary size must be very heavy, and it is questionable whether a scheme of this sort could cover itself, especially on coaching tours with baggage carried free in advance by special tender cars, as is being done. There is a general feeling that to get the business some coach proprietors are willing to give away more than they can afford.

But competition between rival road undertakings is not the only danger. At last the railroads have awakened to the fact that the road will continue to take away their traffic until there is not enough to go round, unless the rail ceases scaring

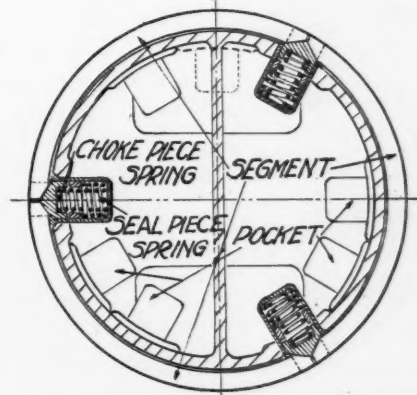
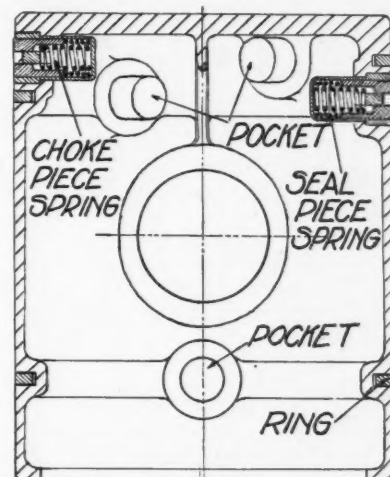
people with high fares. Accordingly wholesale fare reductions in general are foretold and already the railroad people are beginning again to run excursion traffic. Yes, the commercial car is not going to have things quite so much its own way in the future as it has had for the last few years. This competition might have come before but for the coal strike. However, that is now ended, and seeing that labor conditions seem at last settling down, business in general is promising to wake up. Strikes were thought quite possible both among the engineers and railway men but both have voted for a wage reduction rather than a strike.

New Segmental Piston Ring

Such an extensive saving in gasoline and lubricating oil, especially the latter, is stated by British truck users to have been effected by the new Allen piston ring, made by Allen & Simmonds, Ltd., of Reading, England, that the device is apt to interest American engineers. It is really a development of the idea underlying the packing of piston rods and valve spindles on steam engines, in which this firm has had more than 25 years' experience.

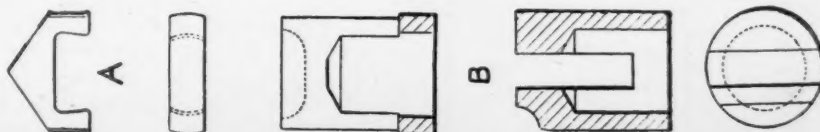
Briefly, each ring is composed of three parts or segments, the ends of which are forced outwards both radially and circumferentially. Sliding outwards under spring action in pockets pressed or cast in the piston sides, is a cylindrical "seal piece" as it is termed, and sliding within this seal piece also under pressure of another and independent spring is the choke piece. Each choke piece bears against the abutting ends of two of the segments, which, like the choke piece are cut at an angle so that the tendency for the choke piece is to expand the segments circumferentially, but at the same time the radial pressure transmitted through the seal pieces also ensures that the segments as a whole shall be pressed radially outwards against the cylinder walls. The whole arrangement can more readily be conceived by studying the accompanying diagrams, one of which shows an arrangement with rings at the top and bottom of a piston that has given good results in truck work.

It must be admitted that the details of oil economy which have been submitted to the writer show an excessive consumption before the rings were fitted, but at the same time the resulting figures also show a remarkably low consumption, whether judged on a comparative or ab-



General Arrangement of the Allen Patent Piston Ring

solute basis. On the same argument, too, the saving of 25 per cent in fuel may be discounted, but both for oil and fuel there certainly seems to be a solid foundation for the claim to materially increased economy.



Showing Separately (a) Choke Piece and (b) Seal Piece of the Allen Piston Ring

A Need for Careful Truck Operators

To the Editor:

I have just read your editorial in July 15th issue under heading "Use Your Influence," and in a friendly way wish to disagree with you.

Maybe you have had the good or bad luck to ride in a passenger car in Detroit, and if so, I think you will agree with me that they need enough publicity to cause the courts to wake up and send quite a lot of truck drivers to jail for six months or so, and then maybe it would be a lesson to the others that pedestrians and other traffic have some rights.

I wish it were possible to send you a reports issued by Detroit Police Department, which shows (if my memory serves me correctly) that there has been one person killed for every 110 motor trucks while there was one for every 1100 passenger cars.

Might does not make right, but this is the stand the average driver takes. I have seen several children with their brains mashed out on the street, legs broken, etc., and if the driver had only taken his time, they would have lived to a fair age. The average truck driver has no regard for human life, property or anything else. His machine weighs enough to plow his way through, no matter how many people he has to kill. Did you ever see one meet a pedestrian or passenger car half way? No, he walks right on through and if you get in his way, you are "S. O. L." (soldier out of luck) and may show up minus your head, legs or arms.

Even a fast passenger train will try to stop, which is a lot more than you can say for the average truck driver.

I think the fear of God should be in the hearts of every truck driver, and that he should be bonded for \$5000 to \$10,000, and then the average employer would pick out honest, truthful and law-abiding men—not children killers. It is my understanding that the pedestrian and passenger car has the same rights as other traffic, but this does not apply to a fellow who has 10 or more tons to help him plow his way through.

Don't you think it better to let everything appear open and above board rather than to get the people down on trucks to such an extent that they will try to bar them off the streets? Believe me, the industry is riding on quicksand and if everybody would demand caution, then I think the people would get their minds off so much legislation. In my opinion, the disregard for others is causing more people to act now than ever before. If you don't believe this, make a practice of taking a traffic officer along whenever you see one and ask him what he thinks. I try to give one a lift to and from his station every time I get a chance, and their opinion is that the feeling seems to be "To Hell with everybody else, clear the road for me as I have weight and nothing this side of hades can stop me."

Let's don't try to pull any strings, as they might let go and work reverse English on us.

L. T. F.

It is unfortunate, but true nevertheless, that there are too many so-called truck operators who have absolutely no regard for the pedestrian or his more fortunate brother who travels the highway in a passenger car. We regret that we have unintentionally given the impression, in our editorial, that we are in sympathy with the baby killers. If we had our way about it, every truck driver or passenger car chauffeur who injured any one through negligence or reckless driving, would be given a long term prison sentence. Real jail sentences would bring some of the reckless ones to their senses. Carelessness on the part of the truck driver and overloading are responsible for many of the drastic laws which are levied upon the truck industry. These are conditions which the dealer should not hesitate to call to the attention of his customers.

No One Type of Road Best, Traffic Needs Differ Much

No effort has been made to encourage the construction of any particular type of road in the Federal-aid projects administered by the Bureau of Roads of the United States Department of Agriculture. The legal requirement that the roads shall be "substantial in character" has not been interpreted to mean that only the most expensive types of roads should be built. It has been recognized that the heavy and expensive construction which is necessary in New York, Massachusetts, and Pennsylvania is not suitable or warranted for the less exacting traffic of Nevada, Idaho, and the Dakotas.

There is a suitable type of road for every type of traffic. Granite blocks are best around wharves and freight depots; country thoroughfares need to be better than rural side roads, lightly traveled. A number of other considerations have influenced the choice of type in many cases. It is frequently found that suitable local materials may cost less than better materials imported from a distance; approval of the use of local materials is not infrequently given for the purpose of encouraging local production. In parts of the far west the entire absence of water along a right of way, and the expense of keeping an adequate supply, often make it necessary to approve the building of a type of construction that can be built without using large quantities of water.

The initial decision as to the type of a particular road is made by the state highway department. The Bureau of Public Roads makes an independent study of the conditions. The most suitable type of road in the judgment of the engineers of the state department and of the Bureau of Public Roads is finally decided upon. The earth, sand-clay and gravel roads which make up 66 per cent of the mileage have cost only about one-fourth of the Federal-aid funds used, while the higher types, including cement concrete, brick, and bituminous concrete have called for 60 per cent of the money to build 24 per cent of the mileage.

Do Pneumatic Truck Tires Damage Newly Made Roads?

To the Editor:

We have seen statements in some of the trade papers to the effect that pneumatic-tired trucks are more suitable for road construction than are those provided with solid or cushion tires. These statements are doubtless made under the belief that a pneumatic tire will not sink so deep into a soft or uncompleted road surface as will a solid tire.

This assumption, however, we believe to be a mistaken idea. Of course, the rounded contour of the pneumatic tire may be said to "hold in reserve" additional side wall space which will come into contact with the supporting surface as the wheel sinks deeper into the mud, sand, crushed stone or whatever other material may be encountered.

But let us consider the actual facts attendant upon the use of the largest-sized pneumatic tire and solid or cushion tire. The twelve-inch pneumatic tire, which is not as yet a commercial success, but which has been produced in limited quantities, must carry an inflation pressure of 140 pounds per square inch. This means that 140 pounds is applied to each square inch of contact surface between road and tire. If the tire is carrying its normal capacity of 8500 pounds of load, the area of road contact will be 61 square inches.

The above figures apply to a five or six-ton truck and in this case, the pneumatic tire will be carrying the limit of its capacity. If we consider the solid or cushion type of tire for a five or seven-and-a-half-ton truck, we find that the weight per square inch of road contact is considerably less. Mr. Fenner, of the International Motor Company, made tests on a seven-and-a-half-ton Mack truck, fully loaded; in which it was developed that a non-resilient solid tire carried a weight per square inch of road contact of but 105 pounds. This indicates that even in the case of a heavier truck, the load is better distributed with the solid tire than with a properly inflated pneumatic. On the basis of the same wheel load, the area of road contact would be 81 square inches for the solid as against 61 square inches for the pneumatic. It is obvious that there would be even a greater difference in these figures were a resilient semi-solid or cushion type of tire to be considered.

Inasmuch as the tendency to cut ruts, to pack the ground, and otherwise to destroy road beds in the process of construction, are based largely on the concentration of weight over a small area, it seems evident that the pneumatic tire, when properly inflated, must damage newly made roads more than is generally supposed, due to the greater weight per square inch of road contact, and conversely, to the smaller area of supporting surface which it presents to the road.

We would like to see this subject more fully discussed.

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